ANNUAL REPORT 2013

seychelles islands foundation

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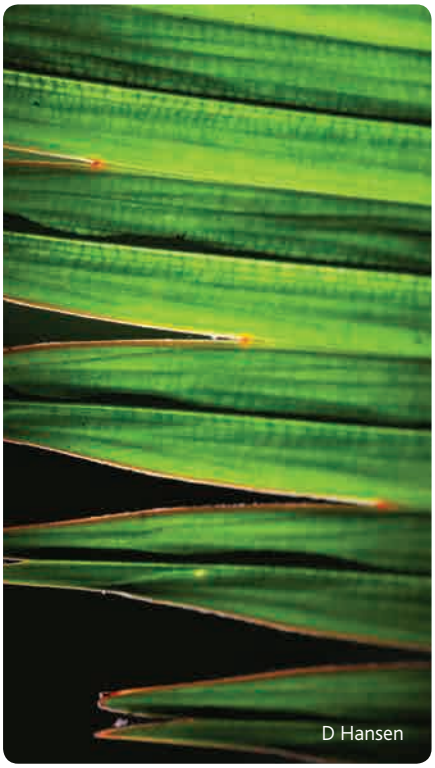
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MESSAGE FROM SIF'S **CEO**

Over the last few years the Seychelles Islands Foundation has re-positioned itself and has taken a lead in the 'business' of nature conservation in Seychelles. In addition to managing the two jewels in the Seychelles' crown of protected areas, SIF's institutional capacity in science, research and environmental management has substantially increased. As a result, a number of projects are successfully implemented and new research initiated each year. 2013 is no exception and this annual report will mark the celebration of 30 years of UNESCO World Heritage status of the Vallée de Mai and another breathtaking dive into the deep turquoise waters of Aldabra which I hope you will enjoy reading about.

Seychelles can be proud of the dedication of the SIF team and commitment to ensure that its UNESCO sites are managed according to global standards with the World Heritage Convention fully implemented at both. At the second Marine World Heritage Managers' conference in Corsica, I presented our work with much delight and we were applauded by people who understand the constraints and logistical challenges of very remote sites. In addition, our best practices and lessons learned are increasingly being used as models and case studies to encourage other sites to follow our example. I am grateful for the many additional hours and the sweat put in by all of the SIF staff – you all know that your work makes a difference.

This year we can add to the achievements of the long-term protection of Aldabra the discovery of a larger dugong population in Seychelles than expected. In March the first helicopter aerial survey revealed a population of at least 14 individuals, including two calves, but is probably more than 20 dugongs. SIF's participation in a new regional project will advance our knowledge of the population size at Aldabra and further afield, and the migration patterns of the dugongs. On the invasive alien species front eradication efforts are continuously on track and, 16 months after its discovery, the introduced Red-whiskered Bulbul was eradicated from Aldabra demonstrating an effective emergency and rapid response action.

At the end of 2013 the Vallée de Mai was in the spotlight when the site's 30-year anniversary of World Heritage inscription was celebrated together with the Praslin community. The wonders of the Vallée de Mai can be well-hidden and one needs guidance and persistence to adapt to the darker light and see its many treasures. SIF's community and outreach programme is making tremendous inroads in revealing these to the community, and the response, especially by school and youth groups, is very encouraging. The young people of Praslin take their natural heritage very seriously, which was evident during a rally demanding a stop to Coco de Mer poaching. Their voices, added to those of conservationists, show engagement which is much needed.

Finally I have to express my gratitude to all of our funders, supporters, collaborators and followers on social media whose input and support keeps us going when the going gets tough. Enjoy!

Dr Frauke Fleischer-Dogley
Chief Executive Officer

2013 HIGHLIGHTS

The Vallée de Mai celebrated its 30th anniversary as a UNESCO World Heritage Site in December with a ceremony and the installation of a 30-year time capsule at the site

An aerial survey for Dugongs was conducted at Aldabra, with a total of 14 individuals seen which suggests a population estimate of more than 20 individuals – a higher number than expected

The 2012/2013 Black Parrot breeding season was the most successful since the start of the SIF research programme, with 23 nests monitored, 15 young fledged and another 34 parrots ringed

A landmark achievement was made with the eradication of the invasive Red-whiskered Bulbul from Aldabra

Free guided tours by SIF staff were launched in the Vallée de Mai to further enhance the visitor experience

The Ring-necked Parakeet intensive eradication phase on Mahé was launched with the recruitment of a dedicated team

The first comprehensive Vallée de Mai plant survey was completed for use in invasive plant control and management

SIF's social media presence was expanded with the re-launch of a dedicated Facebook page

Research activities at Aldabra were diversified with the implementation of a long-term marine monitoring programme

The Vallée de Mai was awarded a 'Certificate of Excellence' by online travel forum TripAdvisor for the second year running

The first geolocator was retrieved from a Red-tailed Tropicbird which will give an insight into their movements

A herpetological field trip confirmed that there are two species of endemic chameleon in Seychelles, one of which *(Archaius scychellensis)* occurs only on Praslin

Aldabra's solar system performed above expectations, supplying 97% of the research station's electricity

The Vallée de Mai welcomed the highest number of visitors to date in 2013, with 83,805 visitors recorded

7 scientific papers were published by SIF staff and collaborators on research conducted at the Vallée de Mai and Aldabra

STAFF CHANGES & NEW POSITIONS


C Mason -Parker

COMMUNICATIONS AND OUTREACH COORDINATOR

Rowana Walton joined the SIF team as Communications and Outreach Coordinator in April 2013. Passionate about the marine environment, Rowana had been working in Seychelles for the previous three years leading a marine conservation project for Global Vision International. With a BSc in English and American Literature and currently studying for an MSc in Biodiversity, Wildlife and Ecosystem Health she brings an excellent combination of communication and scientific skills and knowledge to the role.


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ASSUMPTION INTRODUCED BIRD ERADICATION TEAM LEADER

The Assumption introduced bird eradication project welcomed two new Team Leaders in 2013 with Julio Agricole taking on the position in January. After finishing his A Levels, Julio followed his interest in conservation and joined SIF as an Invasive Species Technical Officer on the eradication project on Assumption. His knowledge of bird behavior developed and Julio was trained in the use of firearms to improve the effectiveness of the eradication. Julio's hard work and dedication was rewarded at the beginning of 2013 with the responsibility of leading the project team for most of the year.


SIF

Jessica Moumou then took over the role in November when Julio had a well-deserved break from the project. Jessica has had a long-standing interest in the environment that was kickstarted by participation in one of the Ecoschool competition visits to Aldabra. She then undertook a two-year course in fisheries science at the Maritime Training College on Mahé. After this she joined Nature Seychelles as a Ranger on Cousin Island, which gave her some valuable insight and experience in avian conservation. In November 2012 Jessica joined SIF as an Invasive Species Technical Officer on Assumption Island. Jessica has excelled in this position and we were delighted to be able to promote her to the position of project Team Leader.

ALDABRA SCIENTIFIC COORDINATOR

2013 also saw a change in staff for the Aldabra Scientific Coordinator. Heather Richards took over the position in May after working as a researcher on the SIF Black Parrot research programme at the Vallée de Mai for the previous two seasons. Heather brings a wealth of conservation experience to this position, with an MSc in Applied Ecology and Conservation, four years working on Echo Parakeets with the Mauritian Wildlife Foundation, and a season on the RSPB White-tailed Eagle reintroduction project in the UK. Previous ASC Dr Janske van de Crommenacker assumed the position of researcher on Aldabra, undertaking genetic research on Aldabra's landbirds.

RING-NECKED PARAKEET ERADICATION TEAM LEADER

The intensive phase of the Ring-necked Parakeet eradication project was launched in mid-2013 and Edme Melton-Durup took on the position of Team Leader. With a passion for the outdoors and the natural world, Edme worked previously for several years as a youth leader at outdoor education centres in the UK and France. Edme returned to Seychelles and was originally recruited by SIF as a Trainee Invasive Species Technical Officer for the bird eradications on Aldabra and Assumption. After several months successfully gaining experience and skills on these islands in bird behaviour, mist-netting and bird handling, Edme returned to Mahé to take on the Team Leader role on the Ring-necked Parakeet project.

VALLÉE DE MAI ADMINISTRATIVE AND ACCOUNTS ASSISTANT

Veronica Souyana joined the SIF team at the Vallée de Mai in September. After teaching for the past 29 years at Praslin Secondary School Veronica decided to take a change in career. Veronica is active in the Praslin community and was the Praslin Red Cross Chairperson for three years and a leader on the Duke of Edinburgh award scheme for four years. But it is the natural world that has always fascinated Veronica and last year she was given a special award for being the longest serving school Environment Leader. Veronica is pleased to join the team at the Vallée de Mai and to be able to combine her administrative skills and scientific knowledge with her interest in the local environment.

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30TH ANNIVERSARY OF THE VALLÉE DE MAI AS A UNESCO WORLD HERITAGE SITE

It was with great pride that SIF celebrated the 30th anniversary of the Vallée de Mai as a UNESCO World Heritage Site on 12th December 2013. Since its inscription in 1983, the Vallée de Mai has become a site where tourism, research and education can coexist and complement each other. This has led to the Vallée de Mai becoming a world class tourist attraction, the development of a permanent education programme, and many new scientific discoveries which have underpinned the importance of the Vallée de Mai.

The value of the Vallée de Mai and its biodiversity has been recognised since 1966 when it was declared a nature reserve. Despite being visited regularly, for many years the forest remained scientifically unexplored. Under the management of SIF since 1989, SIF staff and associated researchers have pursued the exploration of this prehistoric forest and are gradually unearthing its secrets. Many recent discoveries have been made and research has revealed even more treasures than expected. In 2009 a new species of frog was discovered which may only occur on Praslin. In the same year a forgotten chameleon species, which was lost to science for nearly 200 years was re-discovered in the Vallée de Mai, and in 2010, a new cricket species was discovered which is probably endemic to Coco de Mer leaf litter. In addition to this, many other species have been intensively studied, expanding our knowledge of the many unique species and relationships that make this palm forest so special.

With an enhanced communication strategy this information is now being shared with a much wider audience who can all benefit from the outcomes of this research. In recent years research at the Vallée de Mai has increased substantially with the implementation of several regular monitoring programmes, exciting new doctoral research projects and cutting-edge scientific studies. Working in close collaboration with some of the world's foremost institutions has meant that in the last 5 years the Vallée de Mai has hosted ten Master of Science students, two PhD students, and two post-doctoral researchers, who in collaboration with SIF staff have published five scientific papers.

Alongside the development of the scientific research, SIF has also created a popular education and outreach programme based at the Vallée de Mai. With the employment of a dedicated education and outreach officer, consolidation and expansion of the Friends of the Vallée de Mai schoolchildren club, establishment of an education centre at the Vallée de Mai, and regular attendance at community and national events, SIF has made progress with the environmental education of Seychelles and reaching out to and creating the conservationists of tomorrow.

To celebrate the milestone anniversary a ceremony was held at the Vallée de Mai visitor centre on 12th December. The ceremony was a diverse and exciting event and we were honoured to have messages and contributions from several distinguished guests including the President of the Republic of Seychelles, James Alix Michel and the Vice-President of the Republic of Seychelles Danny Faure. The Director General of UNESCO, Kishore Rao, sent a video message in which he applauded SIF on "their long standing commitment and effective management" of the Vallée de Mai. He noted that UNESCO "are confident that the Vallée de Mai will continue its well-established path in safeguarding a natural

Left: Vallée de Mai staff perform at the 30th anniversary ceremony Above: Vallée de Mai staff perform at the 30th anniversary ceremony Below: Marie Laure Viebel's exquisite Coco de Mer inspired art pieces Bottom: The Education and Outreach programme reaches out to future conservationists

World Heritage site for future generations". A video message from SIF staff on Aldabra was also played, and although not present in person they highlighted the importance of the Vallée de Mai to Aldabra operations and research.

The highlight of the ceremony was widely thought to be the pledges given for the next 30 years by various members of society who have been involved in the Vallée de Mai in the past and we hope will stay involved in the future. These pledges were received by Vice-President Danny Faure, who then placed them in a time capsule. This capsule was locked in the wall by the visitor centre and will remain closed for the next 30 years. Our hope is that, when it is re-opened in 2043, all of these pledges will have been fulfilled.

There was also entertainment, with the Vallée de Mai staff performing a new song on the Vallée de Mai that had been composed especially for the event, and the classic 'Garden of Eden' by Seychellois artist Regis Hoareau. SIF also conducted a competition in local schools on Praslin earlier in the year and the winners of both the public speaking and poetry categories had the honour of performing their winning speech and poem at the celebration. It was inspiring to see the passion and enthusiasm that these young people had for the Vallée de Mai and its future.

The Vallée de Mai owes a great deal to the Praslin community who have been instrumental in the continuing protection of this site. In recognition of this dedication to the Vallée de Mai, the Minister for Environment and Energy, Professor Rolph Payet, on behalf of SIF, presented a token of commitment to build two bus shelters on Praslin to Mr Volcere, Honourable Member of Parliament for Grande Anse, Praslin. Through this gesture SIF hopes that the relationship with the Praslin community will further strengthen and grow so that the Vallée de Mai continues to be protected.

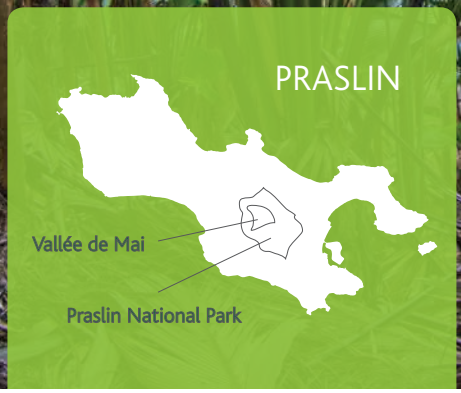
The end of the ceremony was marked by the opening of an art exhibition by Marie-Laure Viebel. A well-known French artist, Marie-Laure is inspired by the Coco de Mer nut and is passionate about this unique seed. The art work exhibits she displayed were all based on the form and symbolism of the Coco de Mer nut with beautiful and striking pieces sculpted from bronze, glass and gold leaf. It was a privilege to host such an exhibition and Marie-Laure's work demonstrated the power of this nut and the inspiration it has provided to artists for many generations.

The ceremony was also used to announce several new interpretation materials for the Vallée de Mai that would be launched in 2014. Three new resources to enhance visitor experience were revealed; a new visitor leaflet, new information boards at the visitor centre and in the forest, and a new Vallée de Mai e-brochure. These products will be launched in early 2014 and further details given in the 2014 annual report.

Whilst attending the ceremony the SIF Board of Trustees also took the opportunity to hold the 2014 Annual General Meeting at the Vallée de Mai. This one day meeting was very productive in discussing the direction of SIF in 2014 and allowing the board members to review the last year of achievements.

All in all, the ceremony was a great success and SIF would like to thank everyone who assisted with the organisation, and who attended the event to make this anniversary one to remember!

C Mason -Parker

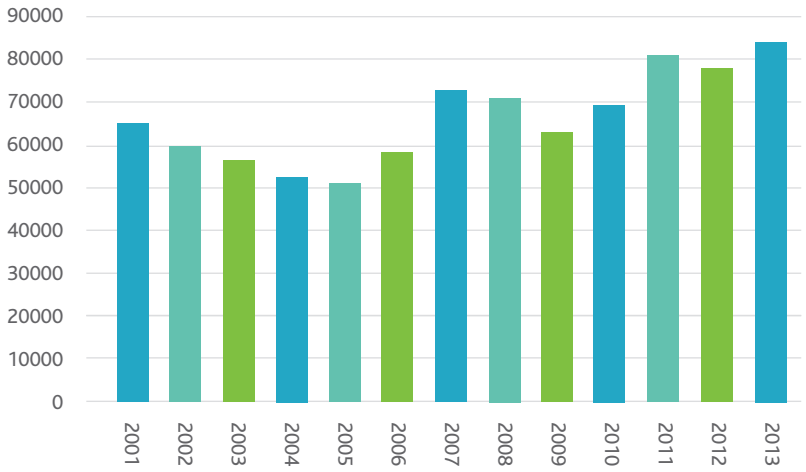


VALLÉE DE MAI MANAGEMENT

A record number of over 80,000 visitors came to the Vallée de Mai this year which continued the upward trend of previous years. The implementation of free guided tours proved popular with visitors as it enhanced their experience of this World Heritage Site. A new regeneration scheme for Coco de Mer was fully implemented and encouragingly the number of nuts poached in the Vallée and Fond Peper decreased (see p.8 for more details on the regeneration scheme).

VALLÉE DE MAI STATISTICS

The Vallée de Mai received a record number of visitors in 2013, welcoming exactly 83,805 people through its gates. This is an increase of 8% from 2012 and the highest number to date. It is fantastic that this site has become such a popular tourist attraction in Seychelles and this is credit to the hard work and professionalism of the Vallée de Mai team. We hope the trend will continue!



Total number of visitors to the Vallée de Mai from 2001 - 2013

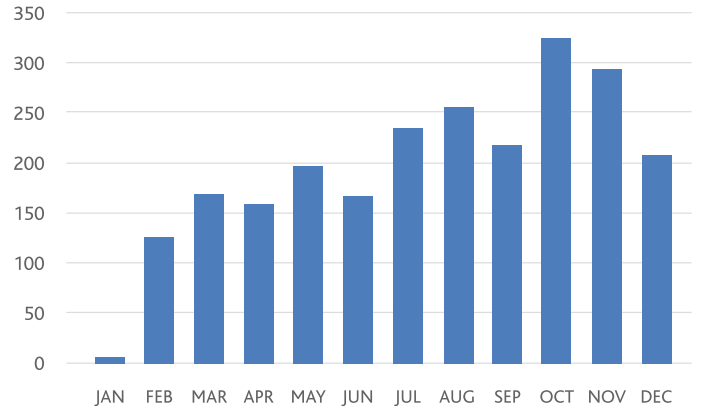
In an effort to ensure the highest visitor satisfaction at the Vallée de Mai, in 2013 SIF launched an additional service of free guided tours. These hour-long tours are available twice a day and led by two enthusiastic and knowledgeable SIF staff. Their detailed knowledge of the flora and fauna of the forest is an excellent enhancement to the visitor's experience and adds value to the trip. This service compliments the tours offered by private tour guides and ensures that visitors can receive information about the Vallée de Mai at any time.

COCO DE MER STATISTICS

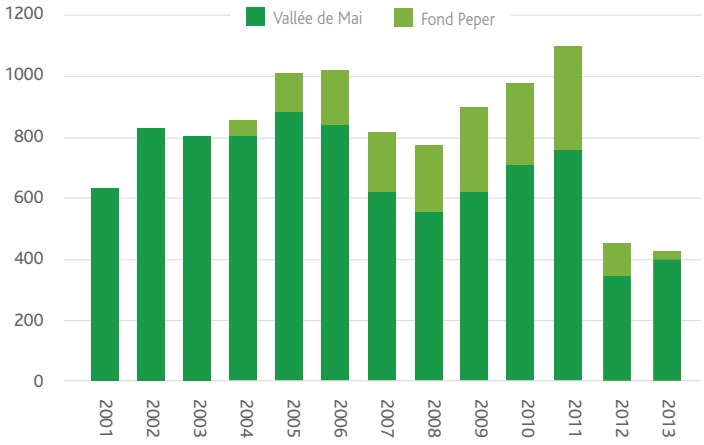
The number of Coco de Mer nuts harvested in the Vallée de Mai and Fond Peper in 2013 was considerably lower than in the last 10 years, with only 427 nuts collected from both locations. The decrease in nuts collected by SIF is due to the increasing success of the regeneration scheme in which more nuts are left in the forest to germinate.

In 2013, more effort was invested by staff to identify the trees that nuts were collected from by writing the tree ID numbers on these nuts. This information will show which trees are producing nuts and where in the forest they are located.

The total number of Coco de Mer nuts poached from the Vallée de Mai and Fond Peper decreased, with 28% fewer nuts poached in 2013 than in 2012. Again we believe this is due to better enforcement within the Vallée de Mai and the continued ban on the export of Coco de Mer kernel.



Number of visitors who took a free SIF guided tour by month in 2013



Total number of Coco de Mer nuts collected for sale in the Vallée de Mai and Fond Peper from 2001 -2013

COCO DE MER REGENERATION SCHEME

Coco de Mer nut

In 2012 a new management strategy was implemented to encourage the regeneration of the Coco de Mer forest in the Vallée de Mai. This scheme was fully integrated into the management plan of the Vallée de Mai in 2013.

Previous data collected on the harvesting of Coco de Mer indicated that as little as 2% of nuts identified were not harvested. Research conducted by Rist et al. in 2010 recommended that a minimum of 20% of nuts should be left in the forest to germinate to ensure sustainable harvesting of the nut. To meet this 20% target a new regeneration scheme was implemented in July 2012. Under this scheme Vallée de Mai staff become 'custodians'. This new scheme fosters a sense of ownership amongst the Vallée de Mai staff for the forest and the Coco de Mer. Our hope is that this scheme will ensure that nuts are protected from poachers and that this will also hopefully deter poachers and therefore secure the regeneration of the forest. In addition, the scheme is collecting useful scientific information on germination and growth, which will improve our understanding of the life cycle of this endemic palm.

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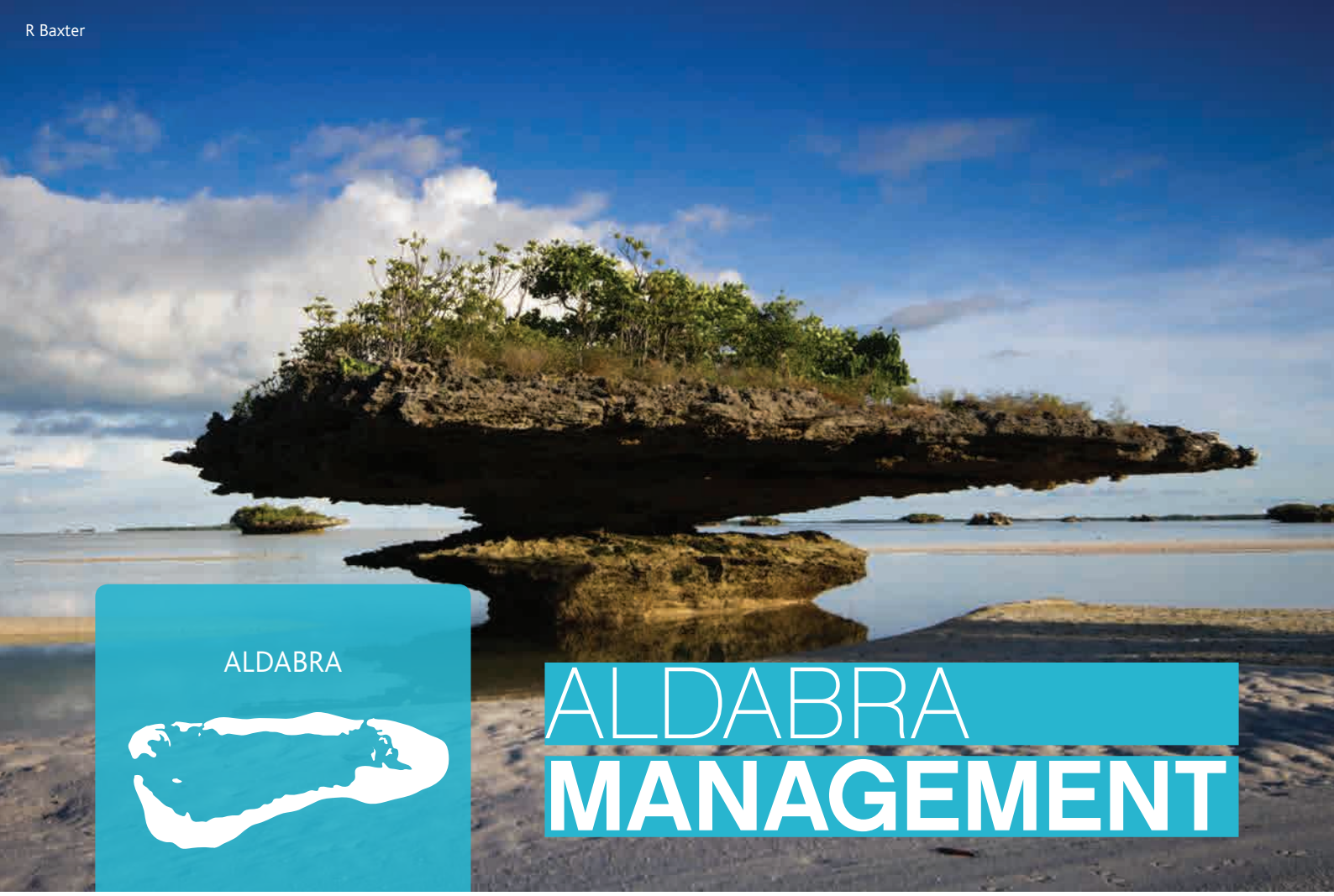


ALDABRA MANAGEMENT

The solar system installed on Aldabra in 2012 exceeded all expectations by providing 97% of Aldabra's energy needs in 2013. This incredible achievement was recognised and detailed in a publication in the IUCN journal PARKS: International Journal of Protected Areas and Conservation, and the project should hopefully serve as a model for other remote islands. Radio communications on the atoll were also enhanced with improvements to the VHF system.

ALDABRA'S SOLAR SYSTEM PERFORMS ABOVE EXPECTATIONS

In 2013, Aldabra's photovoltaic (PV) system produced 35,709 kWh of solar power. In addition 1,143 kWh of power were contributed by the back-up diesel generator. An impressive 97% of the Research Station's energy demand was covered by solar power in 2013. Throughout the year only 530 litres (less than 3 drums) of diesel were consumed on the atoll compared to the average use of 38,000 litres (190 drums) per year before the system was installed.

The diesel reduction of almost 99% not only saved enormous operation costs but also made the supply and work of the Aldabra community much easier. Use of the PV system alone avoided emissions of 37,453 kg of CO_2 during 2013. In addition the investments made into energy efficiency throughout the project reduced the general electricity demand by 57%, avoiding an additional 57,482 kg of CO_2 emissions per year, which were previously produced by the diesel generators.

97%

of Aldabra Research Station's electricity needs were supplied by solar power in 2013.

In 2013, SIF prioritised the energy efficiency project by importing highly efficient inverter-type air-conditioning units (A+++) of the highest available international standards for the research station. Despite the high investment costs the lower consumption of the units makes this an economical and environmentally friendly investment. The exact energy savings of the new air-conditioning units will be analysed in early 2014.

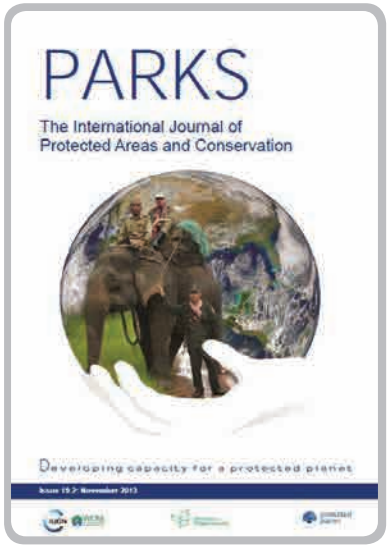
A highlight in 2013 was SIF's first publication about an operation management related topic in the IUCN journal PARKS: International Journal of Protected Areas and Conservation. The results of the renewable energy project were presented in the article "Improving the sustainable operation of a world heritage site: Increasing energy efficiency and implementing a renewable energy system on Aldabra Atoll, Seychelles" (PARKS Vol. 19: 47-58).

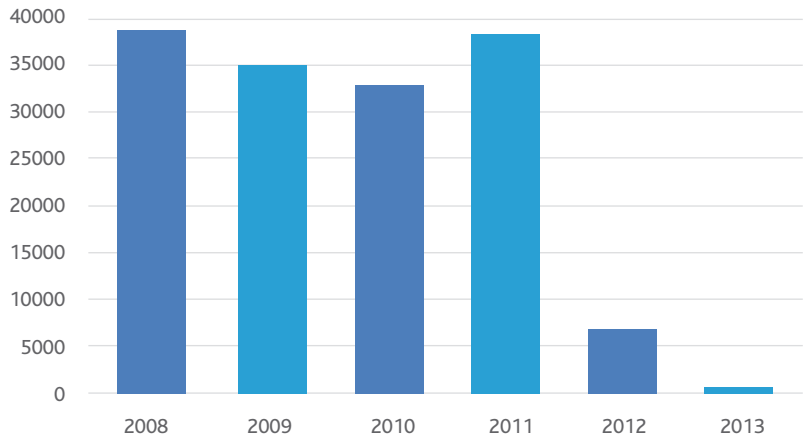
One of the many findings of the renewable energy project discussed in this publication is that investments into energy efficiency are more cost-effective than investments into PV power. These options should be fully explored as a first step to ensure

Above: Aldabra team and SIF board members in front of Aldabra's solar panel system Below: Cover of IUCN journal PARKS: International Journal of Protected Areas and Conservation

economical system sizing and to minimize investment costs. Secondly a successful and substantial reduction of operation costs makes it easier to close financial gaps and is an integral part of sustainable financing for a site as costly to run as Aldabra.

In 2014 the priority in environmental management on Aldabra will shift towards more sustainable waste and water management of the research station. Ideas that are currently being investigated include organic waste recycling, general waste management, as well as possibilities to re-use grey water and the installation of water-saving equipment. In addition renovation of the existing water tanks, and increasing their holding capacity to maximise rainwater harvesting and reduce dependency on the desalination plant are planned.





Annual diesel consumption (in litres) on Aldabra 2008 – 2013

The first AGM for the new board at Aldabra

SIF AGM HELD ON ALDABRA

The future direction of Seychelles' two UNESCO World Heritage Sites – Aldabra Atoll and the Vallée de Mai – was mapped out on Aldabra when SIF's Board of Trustees met for the organisation's Annual General Meeting in January.

Created in 1979 by legal decree as a Public Trust, SIF receives guidance and direction from a Board of Trustees appointed by the SIF Patron, the President of Seychelles. A mix of local and international experts, the SIF Board spent three days on the atoll to review the last twelve months of research, conservation, management and outreach carried out by the organisation, and to set the direction for 2013.

The Board also focused on the Aldabra House project. Announced by the chairman, Ambassador Maurice Loustau-Lalanne, during the Aldabra 30th anniversary celebrations, the project is designed to bring some of the Aldabra experience to Mahé. The SIF head quarters will be designed to serve as a visitor attraction featuring outdoor and indoor exhibits, displays and activities designed to recreate the magic of Aldabra on Mahé, bridging the 1000 km gap between the inner islands and Aldabra. During the AGM the Board discussed financing and architectural options to progress the project.

IMPROVED RADIO COMMUNICATIONS

Under the objectives of the GEF Protected Areas project which SIF is a partner on (see pages 21 – 24), the VHF repeater station installation was revamped on Aldabra's southern Grande Terre coast. The dipole repeater antenna has replaced the whip-antennae, which was relocated to the research station. Consequently the research station currently enjoys near atoll-wide VHF coverage, ensuring much better safety and security for the staff and improving surveillance.

RESEARCH IN THE VALLÉE DE MAI

2013 was a bumper year for research at the Vallée de Mai; the fieldwork for the research into population demography and genetic identification of Coco de Mer was started, the Seychelles Black Parrot had the most successful breeding season since the SIF research programme began, the rediscovered Seychelles Chameleon was confirmed by herpetologists to occur only on Praslin, which has important implications for its status and management, and the Sooglossid Frog fieldwork was completed. Fieldwork for an MSc project on the Giant Bronze Gecko began, a PhD student working on caecilians included the Vallée de Mai as a key sampling site, and experimental research on Coco de Mer pollination continued.

COCO DE MER

LONG-TERM MONITORING ON GROWTH AND POPULATION

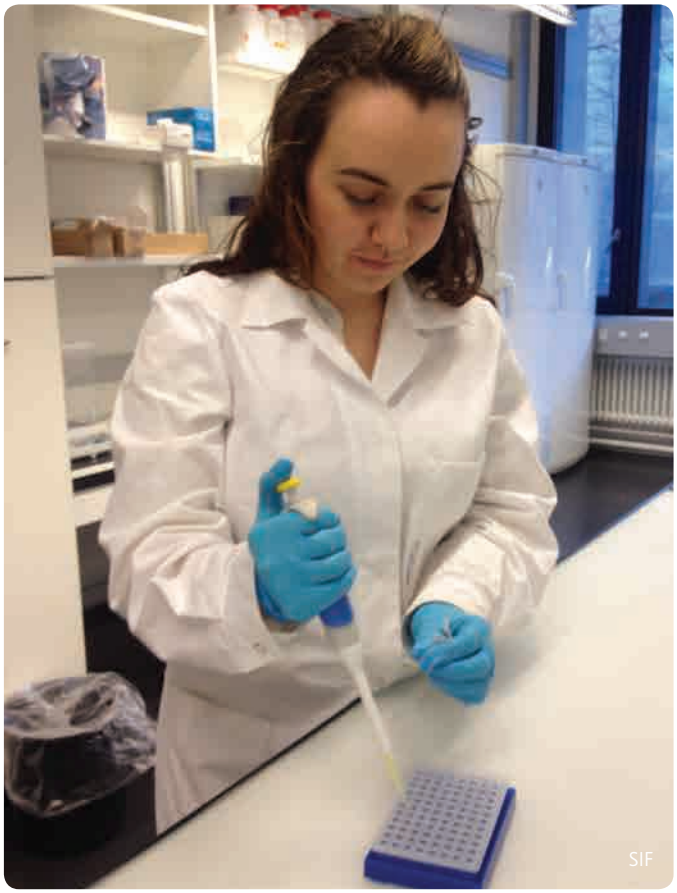
The long-term monitoring on growth and population dynamics of the Coco de Mer continued this year. The growth monitoring programme now includes all of the different age classes (juveniles, seedlings, immature and adult males and females) after revision in 2012 and was continued throughout the year. Preliminary analysis into growth rates in these different age classes is ongoing but it will be some time before conclusions can be drawn about growth of this very long-lived species.

A map of all Coco de Mer trees in the Vallée de Mai has already been produced so this year research staff started to map all adult trees found in Fond Peper. They assign an ID number to every adult Coco de Mer tree and record details such as height, and numbers of nuts and leaves. The resulting map will show the distribution and number of Coco de Mer trees in Fond Peper. As expected, the Coco de Mer trees tend to be concentrated in the valleys, which is unsurprising given that gravity is the main dispersal mechanism of these heavy nuts. So far, 360 female and 362 male trees have been recorded in Fond Peper but this number will increase as the mapping exercise continues.

POLLINATION RESEARCH ONGOING

The exciting work of solving the mystery of Coco de Mer pollination continued this year. Exclusion experiments and use of camera traps were continued for a second season to confirm the main pollinator of the Coco de Mer. Whereas male trees flower abundantly most of the time and attract large numbers of visitors, from insects to reptiles, female flowers are both far less abundant and have only a very short window of receptivity. The dichotomy is the main challenge of this project since excellent data exists on visitors to male flowers but it remains unclear which of these many visitors are responsible for pollinating the female flowers. We are now getting a better idea but solving the mystery definitively requires a detective-like combined

Above: A female Coco de Mer tree laden with nuts **Below:** Who could be the mystery pollinator?



Left: An area of naturally regenerating forest, with many juvenile Coco de Mer clustered around a parent tree **Right:** Emma in the lab extracting DNA from the leaf samples

approach to gather evidence from camera traps, experimental results and stake-outs on female flowers. Confirming the identity of the main pollinator(s) is likely to also require detailed research on animal movements in 2014. Keep an eye on SIF's newsletter and Facebook page for updates and hopefully a resolution to this challenging and exciting project.

GENETIC RESEARCH

In collaboration with SIF, PhD student Emma Morgan from ETH Zurich (Swiss Federal Institute of Technology) began her research in 2013 to understand the demographic and genetic patterns in natural Coco de Mer populations. Under the supervision of Dr Chris Kettle (ETH), Prof Peter Edwards (Singapore-ETH Centre (SEC)), and Dr Chris Kaiser-Bunbury (SIF Research Associate, TU Darmstadt), Emma began her PhD in early 2013. The main aims of her research are to: (1) investigate the population structure under natural conditions using mapping and genetic tools, (2) investigate the factors contributing to female reproductive success and seed-set; and (3) assess the impacts of habitat degradation on the populations.

To achieve these objectives Emma searched for and selected patches of Coco de Mer which showed a relatively natural distribution pattern (i.e. that had not been planted). It has been documented that the entire islands of Praslin and Curieuse were once dominated by Coco de Mer but the species now occurs in large numbers only in a few remaining refuges – the Vallée de Mai, Fond Peper, Fond Ferdinand and Anse Marie Louise on Praslin, and on Curieuse.

Within the refuges of Vallée de Mai, Fond Peper, Fond Ferdinand and Curieuse, Emma sought areas where many juvenile palms and seedlings could be found in dense clusters beneath a mother tree. These areas show a glimpse of the type of tree distribution that would have been observed everywhere on these islands, before large-scale habitat destruction and extensive species exploitation occurred. These naturally regenerating patches look drastically different to other areas within the populations where Coco de Mer was heavily planted in the 1950s and 60s. In these areas the seeds were placed at evenly-spaced intervals, and grew in rows in a plantation-like fashion.

For the genetic analyses Emma collected leaf tissue samples from each of the palms within 16 of these natural patches. The location of each adult tree was recorded and from the adult, the relative positions of each of the offspring were recorded to create fine-scale maps. Back in Zurich, DNA was extracted from the leaves, and 'DNA fingerprints' obtained for 843 individual Coco de Mer palms. Initial genetic analyses confirm high relatedness levels within these tight clusters of individuals, and as a result, inbreeding levels are also high. The analysis also confirms that seed dispersal is very limited, although the distance seeds travel after falling depends on the habitat-type, and slope on which the mother tree is growing.

In 2014 Emma will be returning to Praslin to collect more leaf samples and to continue her research, focusing primarily on the differences in reproductive output among different female Coco de Mer trees. Possible factors to explain the observed differences in the proportion of flowers which develop into mature fruit, and therefore the best growing conditions for the palms will be measured. This will include the distance to the nearest male palms to identify father trees and the differences in limiting nutrient levels in the soils. Genetic analyses will continue and the next phase of fieldwork will be carried out next year.

REPTILES

Left: Giant Bronze Geckos are often seen on male Coco de Mer infloresence. Above: Giant Bronze Geckos have shown a fondness for rotting Jackfruit, with at least 9 seen in this photo Below: The Giant Bronze Gecko

RESEARCHING THE SECOND GIANT OF THE VALLÉE DE MAI : THE GIANT BRONZE GECKO

The Vallée de Mai is rightly most famous for its spectacular giant Coco de Mer but there is another, much more elusive giant, stealthily padding its way around the dense palm canopy. This is the Giant Bronze Gecko, another endemic and very special Praslin species. The Giant Bronze Gecko is among the largest gecko species in the world yet was only described in 2002. It occurs only in the palm forest of Praslin, where it is poorly known. The species is usually only seen very high in the Coco de Mer canopy so previous SIF work on the species has been by opportunistic observation or in short intensive bursts of research with a large team. In the first longer term research focussing on this species, an MSc student from the University of Aarhus in Denmark, Thomas Hæe Mogensen, supervised by Prof. Jens Olesen, Dr Chris Kaiser-Bunbury and Dr Nancy Bunbury, conducted fieldwork on the ecology of the giant gecko between May and October 2013.

Tom's main aim was to complete the first systematic survey of the palm forest and adjacent areas for Giant Bronze Geckos to assess their population status. His additional aims were to catch as many geckos as possible to measure them and collect faecal samples to investigate their diet, and to conduct observations of geckos and Coco de Mer flowers to obtain more information on their behaviour and possible role in Coco de Mer pollination. Tom was ably assisted by SIF research team member Julio Moustache, both of whom were trained in tree-climbing skills so they could climb to the canopy and catch the geckos by hand. They caught over 30 geckos during the 6 months, dwarfing the total number caught in the several previous years. All of the captured geckos were measured, marked, sampled and released.

Tom is now examining a copious amount of gecko faecal material, analysing the data and writing up his results for thesis submission in mid-2014. His findings so far include a breakdown of important food species; Coco de Mer pollen is at the top of the list, and ripe jackfruit also seems to be a major attractant, with at least 10 giant geckos counted by Tom around a single rotting fruit, which has never been recorded before. All of the data from this project will enrich the available information on this rare gecko species and Tom's findings will help to inform and guide the management of both the giant geckos and their giant forest home.

The rediscovered Seychelles Chameleon

REMARKABLE CHAMELEON DISCOVERY: RE-DISCOVERED CHAMELEON IS ANOTHER PRASLIN ENDEMIC

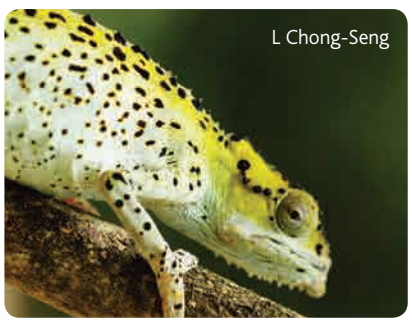
Differences had been observed between the chameleon populations on Mahe, Silhouette and Praslin for some time, but all had been recorded as a single species in recent documents. Further investigations however, revealed that perhaps there was not just one but two species of chameleon in Seychelles.

SIF staff and volunteers, in collaboration with chameleon expert Dr Chris Raxworthy of the American Museum of Natural History, started to look into these differences in more detail in 2009. While researching previous chameleon studies in Seychelles the chameleon researchers came across an essay written by Kuhl in 1820 that described two distinct species of chameleon in Seychelles. The samples he had collected were placed in the National Musuem of Natural History in Paris and labelled as Seychelles Tiger Chameleon and *Archaius scychellensis*. However, within 15 years these records were collated, and for the next 190 years everyone thought that there was only one species of Seychelles chameleon. Upon the discovery of the Paris specimens a comparison was made to chameleons found on Praslin in the 2009 surveys and it was discovered that there were indeed still two species of chameleon, the Seychelles Tiger Chameleon *(Archaius tigris)* and the Seychelles Chameleon *(Archaius scychellensis)*!

Following on from the 2009 work, in February and March 2013, a team of researchers, led by Dr Raxworthy, carried out further research into the distribution of the two Seychelles chameleon species. The team of researchers included former SIF volunteers Bärbel Koch and Anna Gray, as well as Vallée de Mai Site Manager Marc Jean-Baptiste. In the 2013 survey the team visited a number of locations on Mahé, Praslin, La Digue, Silhouette, Fregate and Curieuse to ascertain which of the two species of chameleon, if any, occurred on these islands. Previously neither chameleon species had been documented from La Digue, Fregate or Curieuse. The team also wanted to confirm the species of chameleon on Silhouette. All chameleons found were photographed, described, weighed and measured. DNA samples were also collected to analyse the genetic relationship between the chameleons on different islands.

The survey confirmed that chameleons only occur on the three largest granitic islands of Mahé, Praslin and Silhouette. The Seychelles Tiger Chameleon occurs on all three islands and demonstrates significant population variation in both genetic structure and morphology. The re-discovered Seychelles Chameleon, however, occurs only on Praslin, where it is most abundant in the palm forest, making it yet another species which is endemic to this unique habitat. This work marks the remarkable re-discovery of a species lost by, and to, science, and emphasises the critical importance of habitat protection.

Left: Seychelles Tiger Chameleon (*Archaius tigris*) **Middle:** Seychelles Chameleon (*Archaius scychellensis*) **Right:** Vallée de Mai Site Manager, Marc Jean-Baptiste, with a Seychelles Tiger Chameleon found during the surveys



Praslin Sooglossid Frog J Labisko

AMPHIBIANS

The Seychelles is well known for many of its natural treasures. One thing that should be included in this list is its extraordinarily rich and diverse amphibian fauna. Amphibians (frogs, toads, salamanders, newts, caecilians) do not usually occur on oceanic islands so the Seychelles is atypical in this context. Most oceanic islands are volcanic in origin and are naturally colonised by species from elsewhere. Amphibians cannot survive saltwater immersion so do not usually reach these islands. The granitic islands of Seychelles, however, are not technically oceanic but continental in origin since they were once part of the supercontinent Gondwanaland. These islands therefore carried a fragment of the Gondwanan ecosystem with them as the supercontinent broke up and drifted apart over tens of millions of years. It is reasonable to deduce that amphibians were a part of this original ecosystem and were the ancestors of the many amphibian species endemic to the islands today.

SOOGLOSSID FIELDWORK COMPLETED

Continuing from last year's research, PhD student Jim Labisko, from the Durrell Institute of Conservation and Ecology (DICE) at University of Kent (Canterbury, UK), completed his fieldwork on Praslin's population of sooglossid frogs, discovered in the Vallée de Mai in 2009. This tiny and highly elusive frog species is one of the smallest frogs in the world and belongs to the Sooglossidae group of frogs, which contains just four known species endemic to Seychelles. Before 2009 these species were only known from Mahé and Silhouette but now a population of frogs has been discovered on Praslin and could be restricted to only this island. Following last year's priority of collection of biological samples, this season saw Jim's focus shift to obtaining recordings of vocalisations from individual frogs across the islands to support the morphological and genetic work already underway. Recordings of frog vocalisations were taken both within the Vallée de Mai and the wider Praslin National Park, as well as from Mahé and Silhouette, for later comparative analysis. Jim now has hundreds of hours of vocal recordings to sift through and analyse, alongside the labwork and statistics. Preliminary results from Jim's analysis are expected in 2014.

Independently, and as part of the Darwin Initiative EDGE Species project, Jim undertook training of Vallée de Mai

research staff Nathachia Pierre and Dainise Quatre, in methods for audio monitoring of frog populations. In collaboration with Seychelles National Parks Authority and the EDGE project, this monitoring is scheduled to continue on all three islands with the aim of obtaining a long-term dataset that will help indicate trends in abundance and distribution of these tiny frogs.

CAECELIANS

The Seychelles has more species of caecilian than it has of any other group of amphibian or reptile. Caecilians are limbless amphibians, often mistaken for large worms or snakes by the untrained eye because they are very little known. But they are an important group, particularly in Seychelles, which hosts the highest caecilian diversity relative to its area in the world. At least six known species of caecilian are endemic to Seychelles, but they are poorly studied, largely because they spend most of their lives underground and are rarely seen. One of the Seychelles' caecilian species is listed in the top 100 of the EDGE (Evolutionary Distinct and Globally Endangered) amphibian list, making it a priority species for conservation. Some of the Seychelles' caecilian species may be endemic to only one or two islands and they are so little known and difficult to study that threats and population declines may be missed.

A group of researchers working in collaboration with the EDGE Seychelles project, of which SIF is a partner, are now trying to change this and shed more light on these elusive creatures. PhD student Simon Maddock, and his supervisors, global caecilian experts Dr David Gower and Dr Mark Wilkinson of the Natural History Museum London, are working closely with EDGE project staff and fellows to survey and locate caecilians, along with tree frogs, to examine the their evolutionary history and make recommendations for their conservation. The palm forest of Praslin, particularly the Vallée de Mai, provides important habitat for these amphibians because of its lack of degradation and abundance of freshwater areas.

Simon carried out his first fieldwork stint in 2013, conducting surveys on Mahé, Praslin, Silhouette and La Digue and checking other islands for signs of these amphibians. The team measured, and collected ecological data and samples from all animals found. A major achievement of the first field period was that the team became confident in field identification of the six species, which all look very similar (some require a magnifying glass to distinguish!). The EDGE Fellows linked to the project, who are all staff from the Seychelles Natural History Museum, Seychelles National Parks Authority, Island Conservation Society and SIF, were also trained and tested in identification skills, meaning that there are now surely more people able to distinguish the six species of Seychelles caecilian than ever before! Simon returned to the UK for preliminary labwork and analysis on the initial samples and data but he will be back in 2014 for a longer visit. We look forward to the results of this important research.

Above: Caecilians are limbless amphibians and Seychelles is home to several species Below: The Vallée de Mai provides important habitat for caecilians

Seychelles Black Parrot P Woods

BLACK PARROT

The most successful Black Parrot breeding season since the beginning of SIF's monitoring programme four years ago came to an end in March 2013. More nests were found and monitored in the 2012/2013 breeding season than in any other season and at least 15 chicks are known to have successfully fledged.

A total of 23 nests were found and monitored in the 2012/2013 breeding season by the team, led by Anna Reuleaux and supported by research staff Heather Richards and Terence Payet. This eclipsed the previous maximum of eight nests found in the 2010/2011 season. Unfortunately several of the nests failed, but the research team were able to capture important information by confirming the reasons for failure of a few nests. Rats were responsible for the failure of at least two nests. On one occasion a rat was caught 'red-handed' for the first time by a timed infrared picture, which captured images of the rat entering the nest cavity at night and the distressed female parrot trying to protect her chicks. She was sadly unsuccessful and her two chicks were found dead at this nest the next morning. Evidence is also mounting for invasive Indian Mynah Birds being an additional threat to parrot nests, with several eggs showing signs indicative of mynah predation and observations of Mynah Birds entering cavities and harassing black parrots.

A new development this year was finding

Above: Rio in action assisting SIF rangers with a Black Parrot presentation in a school on Praslin Below: A newly ringed Black Parrot

> " A total of 23 nests were found and 15 chicks fledged, in the 2012/2013 breeding season "

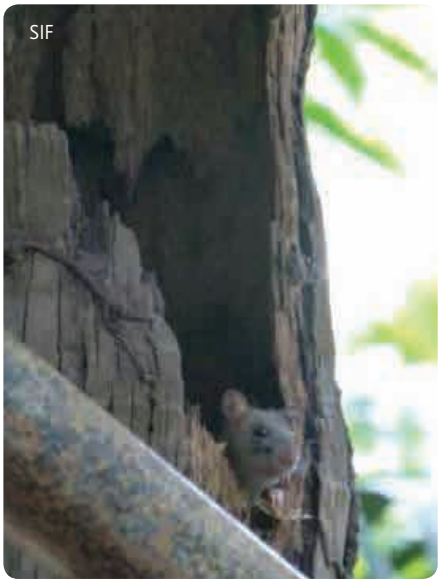
many Black Parrot nests outside the Vallée de Mai and the Praslin National Park. Nesting was confirmed in Fond Ferdinand and on the Coco de Mer Hotel property at Grande Anse. Nests were also found in tree species other than Coco de Mer. Locating and monitoring these nests has shown that the parrots can sometimes successfully nest in dead hollow broadleaf trees and in millionaire's palms (Palmiste). In addition, 34 more parrots were ringed this season bringing the total number of ringed parrots since 2009 to 146. Each parrot is assigned a unique colour ring combination, making it individually identifiable, which is essential for long-term monitoring of individuals, survival monitoring and behavioural observations.

A special and unexpected find in this season was a handicapped fledgling. The baby parrot's wing was damaged before leaving the nest (possibly a deformity from egg stage) and it would have never been able to fly. To save the fledgling from certain death it was taken into captivity, and kindly adopted by the Coco de Mer Hotel. The parrot was named Rio Zolinwanr and Rio has adapted well to the new conditions becoming very tame and friendly. Rio has since had a busy year acting as an ambassador for his species, in particular educating Praslinois schoolchildren and raising awareness for Black Parrots and Praslin's endemic biodiversity. Black Parrots do not show any difference between the sexes before reaching breeding age so we don't know yet whether Rio is male or female.

The 2013/2014 breeding season began in November 2013 and got off to a good start with plenty of breeding activity observed throughout November and December, which is an encouraging sign for another promising breeding season. This season Vallée de Mai Ranger and ZSL EDGE Fellow, Terence Payet, who has worked on the Black Parrot team for the previous 2 years, was leading the research team for the first time, with the assistance of new volunteer Patrick Woods. At the end of

2013 the monitoring is concentrated on the core breeding areas of the Vallée de Mai and Fond Ferdinand with all known nest sites being checked. New nests and breeding behaviour, such as chasing, mutual feeding and the female's unique breeding call are being observed daily. As of the end of December, 11 nests have been found and are being monitored, with seven chicks hatched so far. Black Parrots usually lay only 2-3 eggs per nest, and one notable finding this season was one female at Fond Ferdinand laying four eggs! This has been an interesting observation, adding to our increasing knowledge of the Black Parrot's breeding ecology and demonstrating the value of SIF's continuing Black Parrot research.


SIF


SIF

Egg with possible beak marks from Mynah on left, and rat occupying nest site on right

WHAT'S IN A NAME? PROGRESS TOWARDS CONFIRMING THE SPECIES STATUS OF BLACK PARROTS

There has been a strong conviction by experts and amateurs alike for many years that the Black Parrots on Praslin are unique to Seychelles. The Seychelles Black Parrot *(Coracopsis nigra barklyi)*, however, is officially only recognised as a sub-species of the Madagascar Lesser Vasa Parrot. Specialists have long considered that the differences in plumage, size, vocalisations, behaviour and ecology between the Seychelles and Madagascar/Comores *(Coracopsis nigra)* sub-species are sufficient to warrant an 'upgrade' to distinct species status, but the necessary background work on genetics and detailed morphological analysis, to compare with other sub-species, was missing to confirm this.

It's worth asking how name and status can be so important when direct conservation actions to protect the population would appear to be more beneficial. This, however, overlooks the fact that conservation happens in a broader context of funding channels and national and international legislation and networks. Species recognition can lead to different funding opportunities, strengthened legislation and protection measures, and of course a more accurate reflection of the evolutionary status of a population. Particularly as the black parrot is the national bird of the Seychelles and has a tiny distribution and population size, official recognition of species status of will ensure conservation protection and international attention, and will safeguard its future.

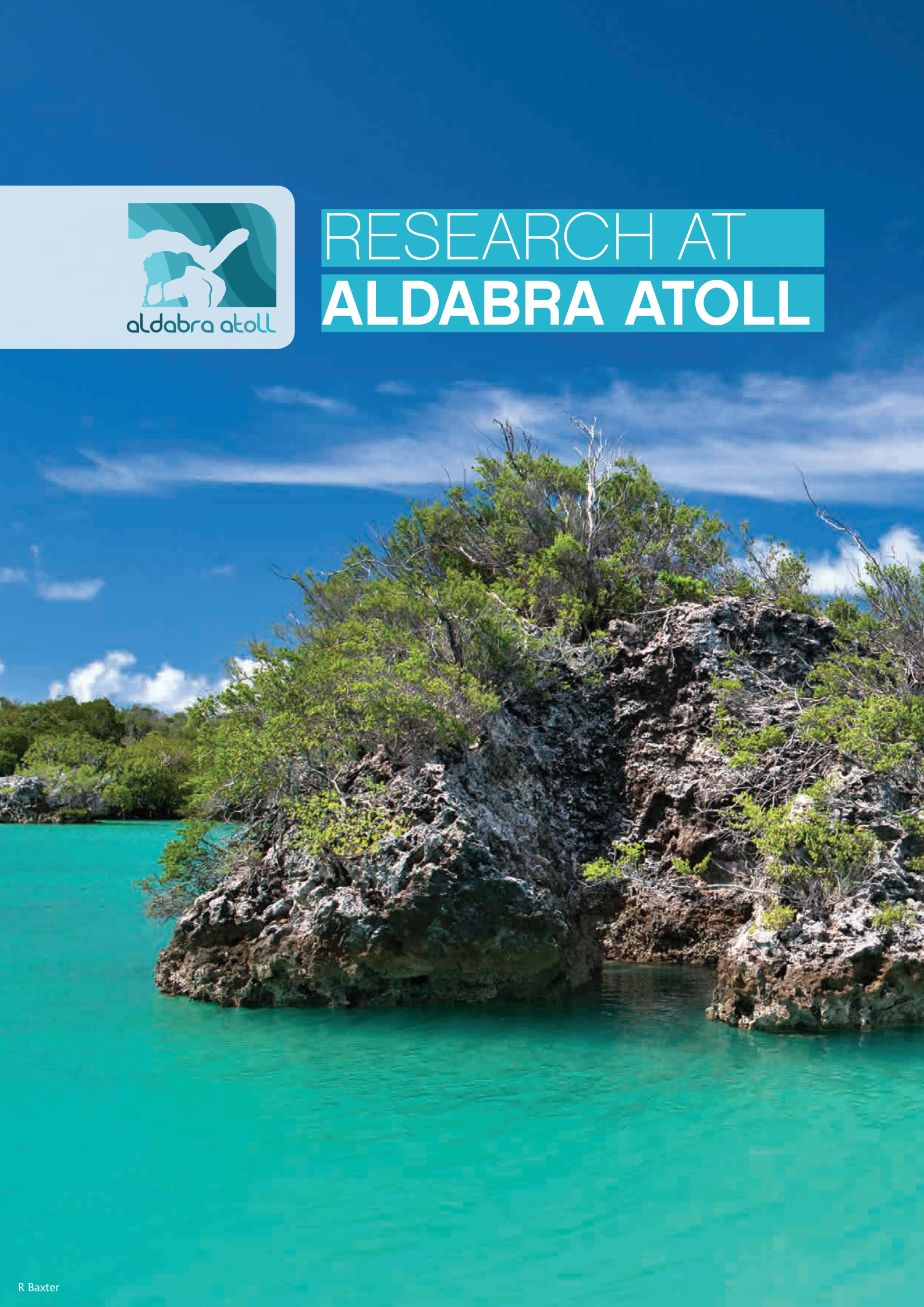
Throughout 2013, SIF has been working in partnership with conservation geneticists, Dr Jim Groombridge and Hazel Jackson, at the Durrell Institute of Conservation and Ecology (DICE) at the University of Canterbury, Kent (UK), to conduct the genetics and morphometric analysis for this project. Hazel, who is carrying out the DNA analysis, is an expert on Ring-necked Parakeet genetics and is enjoying the chance to apply her skills to an endemic island species.

In preparation for this extensive genetic and morphology work, all black parrots ringed in the SIF research programme in the last 5 years have had a blood sample taken. Hazel is comparing the DNA extracted from these samples to DNA from Madagascar and Comores black parrots to examine the evolutionary relationships between the parrots more closely. In addition, she has extracted DNA from museum samples of Seychelles Black Parrots to compare the genetic diversity from the same population a century ago, which may provide clues on recent population trends. The research is expected to finish in 2014 so expect more news on this in the next annual report!


R Mischke

aldabra atoll

RESEARCH AT ALDABRA ATOLL



R Baxter

The successful management of Aldabra depends on a rigorous and extensive scientific research programme and the importance of this research was again demonstrated by SIF's achievements in 2013. The Aldabra Research Team carried out the long-term monitoring programmes, collecting important data on climate, plant phenology, coconut crabs, turtles, tortoises, landbirds, wading birds and tropicbirds. These substantial datasets allow seasonal variation to be distinguished from longer term trends, providing the means to detect declines in species or changing conditions and to identify encouraging patterns, such as the continued increase in nesting turtles on Aldabra discussed below. It is essential that SIF has this valuable knowledge resource to ensure that management decisions on Aldabra are supported by this scientific evidence to ensure conservation effectiveness.

In addition, marine research on Aldabra started in earnest this year with a coral reef and fish monitoring programme finalised and implemented and substantial data collected. 2013 also saw an aerial Dugong survey undertaken with some exciting results. Investigations into the iconic Giant Tortoise continued as part of a collaborative project, and a new project started under this initiative to explore the seed dispersal network of Aldabra. A new genetics project has also started to resolve the status of some of Aldabra's landbirds.

MARINE **RESEARCH**

GEF PROTECTED AREA PROJECT

This year marked the third year of the Global Environmental Facility (GEF) funded project "*Strengthening Seychelles' protected area system through NGO management modalities*". SIF received funding in this multi-partnered NGO project to: (a) expand the Aldabra Marine Protected Area (MPA); (b) improve surveillance and enforcement (see page 10); (c) develop a sustainable financing strategy (completed in 2011); and (d) develop thresholds and bio-indicators as benchmarks in the management of Aldabra's ecosystems.

HIGHLIGHTS AND ACHIEVEMENTS

Some highlights of the GEF project for 2013 included the further development of the Aldabra seaward reef map, participation in the Pangaea Project, completion of the VHF set-up on Aldabra, and the development and implementation of a marine bio-indicator programme that aims to establish change over time in reef and fish communities around Aldabra.

Data collected in 2012, along with satellite imagery acquired in 2013 assisted with the creation of an outer reef map for Aldabra. Although the map is not complete key findings so far are that areas previously thought to be barren, wave beaten sections of algal reef and bedrock coastline, host rich patches of the branching Acropora coral along the South Coast. There were also clear signs of coral recovery and colonisation since the 1998 coral bleaching event, and a section of unprotected reef was discovered, for which the ramifications could be substantial, as it includes several IUCN red listed species, and rich coral reef deposits. The satellite imagery will be further processed and a ground-truthed reef map derived in 2014. The information will then be used to validate the Aldabra MPA expansion.

PANGAEA PROJECT

2013 saw SIF participate in the 'Pangaea Project', a collaborative research initiative between the South African Institute for Aquatic Biodiversity (SAIAB), the Seychelles Fishing Authority (SFA), the Seychelles Islands Foundation (SIF) and the Island Conservation Society (ICS). The M/V Pangaea was used as a research platform by the various organisations to conduct snap-shot surveys and short-term data collection at numerous sites throughout the South Western Indian Ocean; and to assist in the establishment of long-term monitoring projects at selected sites such as Aldabra. The main research themes were to: (i) undertake baseline fish surveys to investigate species composition and record the abundance and size frequency of important fishery species; and (ii) evaluate connectivity by studying fish behaviour, habitat use and movement behaviour, as well as genetic stock structure of geographically separated populations.

Pangaea visited Aldabra in October/November and subsequently went on to Cosmoledo, Etoile, Boudeuse Island, Rémire and African Banks. Whilst at Aldabra, SIF research collaborator SAIAB undertook several different methods of data collection for research projects on fish species under the themes given above.

MARINE MONITORING PROGRAMME

Despite the fact that Aldabra waters are a treasured Marine Protected Area, the majority of research and monitoring on Aldabra has been focussed on terrestrial species. One reason for this is the logistical challenges faced when collecting marine data in such an isolated and harsh environment. Aldabra is designated as a UNESCO Marine World Heritage Site (WHS), and as part of its mandate to maintain the core WHS values, a marine monitoring programme was much needed. In 2013 the Aldabra team was joined by SIF's GEF coordinator, Philip Haupt, to lead the implementation of the marine monitoring programme. This coincided with the visit of the M/V Pangaea, a 60m vessel made available for scientific research in the Seychelles. SIF used the resources of Pangaea to kick-start the new long-term marine monitoring programme.

A marine programme was developed that would allow for detection of changes to the marine ecosystem as a response to environmental or anthropogenic pressures, and serve as an indicator of marine ecosystem health. The marine programme now includes SCUBA dive transects to monitor benthic cover and fish assemblages, and Baited Remote Underwater Video systems (BRUVs) and unbaited systems (RUVs) to monitor abundance and distribution of fish populations. The programme aims to provide a baseline that will allow subsequent changes to be detected and measured and used for management decisions.

Coral reefs are one of the most important but rapidly declining ecosystems in the world's tropical oceans. They are a complex habitat which provides shelter and food for many species, protect us from wave action and storms, provide food for millions of people and host 25% of the ocean's biodiversity. In 1998, high sea surface temperatures caused one of the largest coral bleaching events recorded in the region which caused a coral mortality rate of up to 95% in Seychelles. Aldabra's reefs also suffered, however it is one of the few sites where the recovery process can be monitored in the absence of human interference.

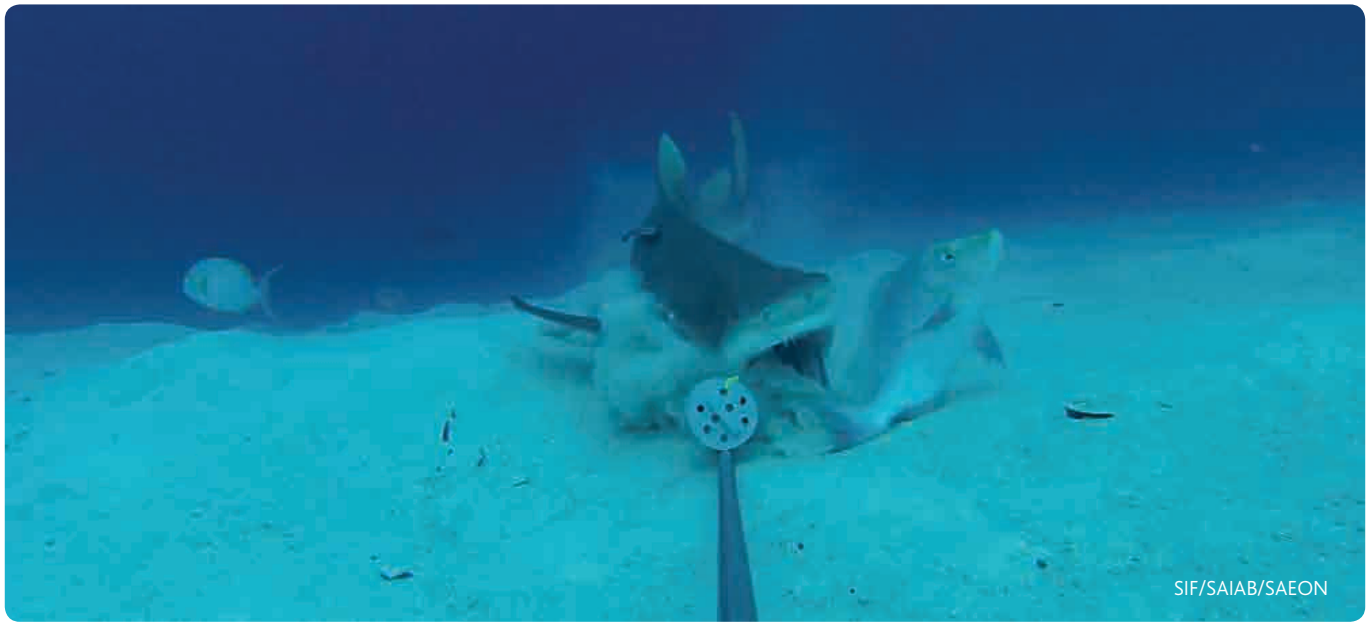
> " Aldabra's reef is one of the few sites where coral recovery post bleaching can be monitored in the absence of human interference "

Coral reef monitoring was previously carried out at Aldabra every few years from 1999 to 2008 by the Aldabra Marine Programme (AMP) in collaboration with SIF. Piracy and financial constraints prevented the AMP from continuing but the new SIF monitoring programme will use the AMP transects to continue this valuable long-term coral reef data set. In 2013 seven permanent transects were installed which will be monitored for water temperature, benthic cover and fish communities through SCUBA-based surveys. This was done with the assistance of Global Vision International (GVI) Science Coordinator, Lee Cassidy, who joined Philip and the Aldabra team to help coordinate the site preparation and initial surveys. A further five transects will be established in 2014. The benthic surveys measure the percentage of live hard and soft coral, dead coral, and algal covered reef structures, using video and photo-sampling techniques. A video and photo record establishes an archive that can be analysed in greater detail at a later stage at genus and species level. Along the same transects 80 species of fish from functional feeding groups (e.g. herbivores, coralivores, planktivores, invertivores and piscivores) were counted and their size estimated. The relative abundance of the fish species in these groups reflect the habitat and food availability, and serve as an indicator of ecosystem health. Temperature dataloggers were also deployed at selected sites around the atoll at various depths to monitor changes in water temperature, in light of previous bleaching events.

The preliminary results of these initial surveys suggest a slow and steady increase in both hard and soft coral cover at Aldabra. Coral species that are well adapted to colonising bare habitats were prolific in the shallower areas, where bleaching had most affected the coral. The fish life was highly diverse with a high abundance of top predators dominating the fish communities, reflecting a healthy and well-balanced ecosystem. The full data set from these surveys is expected to be analysed in 2014.

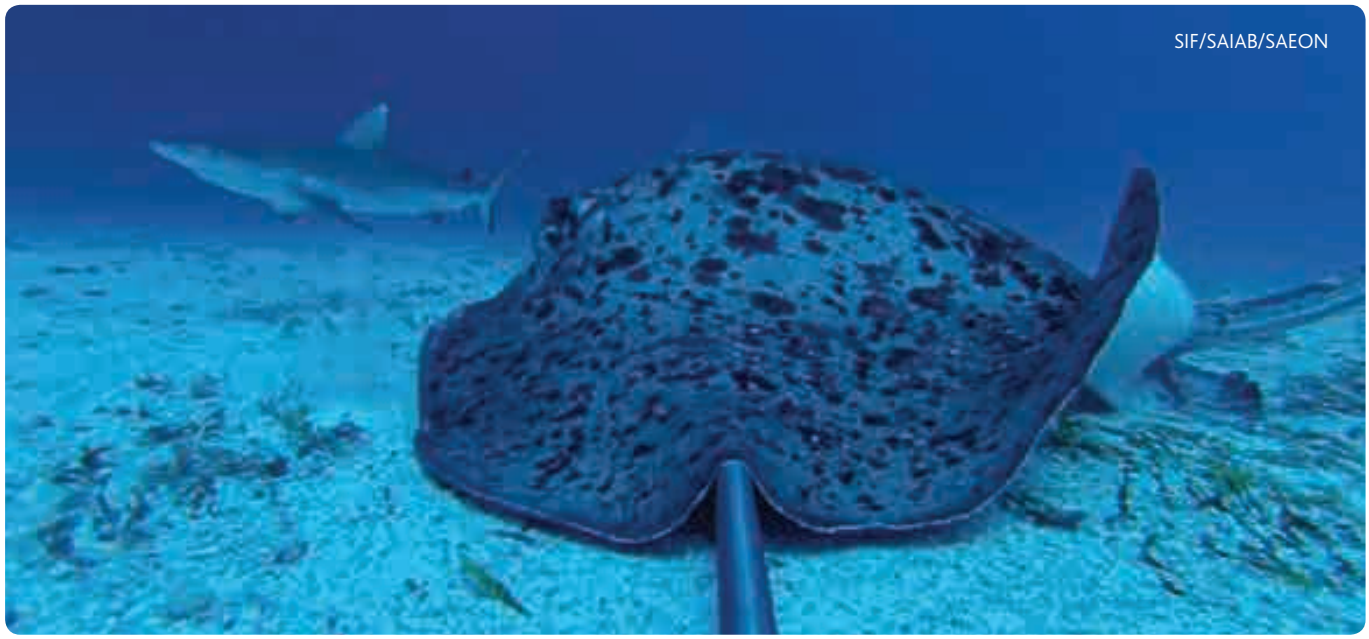
A de Groene

Left: Divers conducting surveys **Top:** M/V Pangaea moored in front of Settlement Beach at Aldabra **Below:** BRUV equipment ready for surveys



The rich fish life of Aldabra provides a rare view into an ecosystem unaffected by large-scale human impacts. Unbaited Remote Underwater Video systems (RUVs) and Baited Remote Underwater Video systems (BRUVs) are an ideal way to document fish diversity at Aldabra across different habitats and depths. The method is especially well suited to monitoring top predators, an essential part of Aldabra's fish composition. Using video monitoring is also relatively cheap, easily deployed and gaining popularity globally. More importantly, this standardised approach allows for data collection to be replicated at the same site or even compared with data from other sites, making it an ideal tool for long-term monitoring at Aldabra. The baseline data will be used to evaluate the relative abundance of the same functional feeding groups, e.g. top predator abundance, as part of the GEF objective to develop a monitoring programme for bio-indicators of ecosystem health.

A total of 105 RUV and BRUV deployments of approximately 1 hour each were done at Aldabra, in a collaborative effort between SIF and scientists, Dr Paul Cowley, from the South African Institute for Aquatic Biodiversity (SAIAB), and Dr Anthony Bernard, from the South African Earth Observation Network (SAEON). Data collected so far established that RUVs (unbaited) videos capture a different component of the ecosystem, and are needed to record the more sedentary reef inhabitants that are scared away once predators arrive. The species diversity recorded during unbaited videos is higher than during baited videos, particularly on coral reef. Top predators, especially reef sharks, Potato Groupers and Twin-spot Snappers, are highly abundant and usually dominate the baited videos, corroborating early findings from diver-based surveys. Other large elasmobranchs such as Scalloped Hammerhead Sharks and Tiger Sharks are occasionally recorded. The surveys will continue in 2014 to complete the first data set necessary for a baseline on this exciting new monitoring programme. It is hoped that new marine monitoring programme will provide the scientific basis for sound management planning and practices to preserve the ecological integrity of the atoll's marine ecosystem.



Top: More megafauna captured during the BRUV surveys, this time a Lemon Shark lunges for a fish **Above:** A Grey Reef Shark and Marbled Ray captured during the BRUV surveys

ALDABRA DUGONG SURVEY

Dugong OSF/D. Fleetham/Animals Animals—Earth Scenes

An aerial survey was undertaken in early 2013 to establish a population estimate for the dugong population at Aldabra. Dugongs are marine mammals, also known as sea cows, and are globally classified as vulnerable to extinction by the IUCN Red List of Threatened Species. The majority of the world's dugong population resides in Australia, although dugongs also occur in the Western Indian Ocean including at Aldabra Atoll, which is now the only island in Seychelles where they occur. Aldabra's large and shallow lagoon (200 km^2) with its large seagrass beds provides ideal habitat for dugongs, and dugong sightings have been recorded from as far back as 1970. It is not known whether Aldabra's dugongs are permanent residents or only semi-resident: the latter might be possible as dugongs are known to move long distances between areas. However, Aldabra could potentially be a breeding site as adults with young were again sighted in 2013.

So far, most of Aldabra's dugong sightings have been recorded from boats, although on a few occasions, a flying inflatable boat was used for opportunistic aerial surveys to check for dugongs and other marine mammals. Most of these sightings were single individuals or pairs, and on one occasion a group of four individuals. This suggested that the Aldabra population was limited to only a very small number of individuals.

In February 2013, with the assistance of the Save Our Seas Foundation, the first aerial dugong survey using a gyrocopter and helicopter was undertaken on Aldabra. Surveys were conducted on transects within a large part of the lagoon, with one survey also taken on the outer reefs of Picard and Malabar Island. In total, 14–20 different dugongs were observed including a sighting of a mother and very young calf. This is the largest number of sightings to date, despite the whole lagoon not having been surveyed.

Where the largest estimate prior to 2013 was four individuals, the new estimate is a minimum of 11-14 individuals. It is highly likely that Aldabra's dugong population is larger than this minimum estimate, as the survey finished prematurely, due to bad weather, and did not cover the entire lagoon. Even in the surveyed area, individuals could have been missed, for example those that were diving or swimming deep in the channels when the aircraft flew over, or those outside the lagoon that were not covered by the surveys. For these reasons the transect survey did not yield a reliable final estimate.

The discovery of so many dugongs marks another milestone in Aldabra's conservation history. The sightings will also help to determine which areas should be closely searched in future surveys, namely the area in the south of the lagoon between Dune d'Messe and Dune Jean-Louis. Further aerial surveys are needed to monitor the lagoon in its entirety and fine-tune the population estimate using a standardised method. This will help ascertain whether the Aldabra population is healthy and stable, and identify management strategies that will protect these endangered migratory marine mammals even beyond Aldabra.

TURTLES

The long-term turtle monitoring programme continued on Aldabra throughout 2013. Turtle emergences in 2013 on Settlement Beach were significantly higher than in any previous years suggesting that the number of Green Turtles nesting on Aldabra is continuing to rise! Seasonal patterns of Green Turtle nesting were also similar to previous years. 217 Green Turtles and seven Hawksbill Turtles had flipper tags attached this year. 109 nesting Green Turtles were resighted in 2013, none of which had been seen in the last two years, suggesting female turtles spend at least 2 years at feeding grounds but more typically 4-6 years before returning to nest again. Despite some concerns that the lighthouse installed on Picard in late 2012 could adversely affect nesting turtles on Settlement Beach, an initial review of turtle nesting patterns do not suggest that this is the case.

Nesting Green Turtle on Aldabra

BIRDS

Aldabra Fody M Sur

LANDBIRD GENETICS

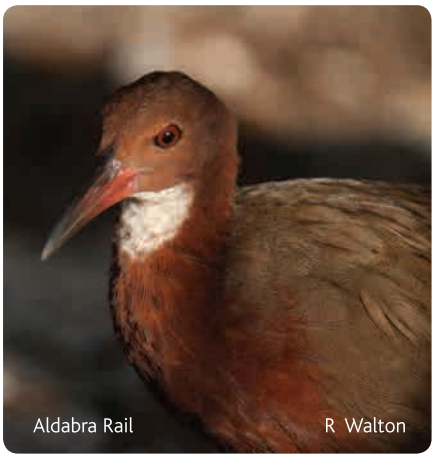
Of the 13 landbird species resident on Aldabra, only one (the Aldabra Drongo) is a recognised endemic species. The others are all categorised as subspecies derived from close relatives in the Western Indian Ocean region, mainly Madagascar. Earlier studies attempted to resolve the status of some of Aldabra's landbirds based on morphology and genetics, but failed to deliver conclusive results. In 2013 SIF took up this research again and resident researcher, Dr Janske van de Crommenacker, was based in Dr Jim Groombridge's conservation genetics lab at the Durrell Institute of Conservation and Ecology (DICE), University of Canterbury, Kent (UK) for several months to conduct phylogenetic analyses on Aldabra landbird blood samples.

The key aims of this genetics project are twofold:

1. Assess hybridisation between Aldabra and Madagascar Fodies

After the discovery of an invasive Madagascar Fody population in the Takamaka region of Aldabra in early 2012, the team came across a number of fodies that were not easily distinguishable as either Aldabra or Madagascar Fodies. The species are very similar, and can only be readily identified in the field during the breeding season. The 'suspicious' birds showed a mixture of features of both species, which raised the concern of hybridisation between the invasive and native fodies. Madagascar Fodies are known to have hybridised with other endemic fodies in the region, so the risk was considered realistic and serious. Hybridisation is not always considered a bad thing as it can introduce new genes into a population and benefit genetic diversity. In this case, however, with a small endemic population of Aldabra Fodies and a rapidly expanding population of invasive Madagascar Fodies, there is a real threat of the endemic species being 'swallowed up' genetically by the new invasive, and no longer existing in its original form. If this were to happen, Aldabra would eventually lose its endemic fody and have only the Madagascar Fody (which is already widely introduced across the islands of the Indian Ocean) and its hybrids. Hybridisation therefore poses an insidious threat from invasive species and we have a responsibility to not only try to prevent the above scenario, but to understand the situation both for our management of Aldabra and to advise other islands facing similar threats.

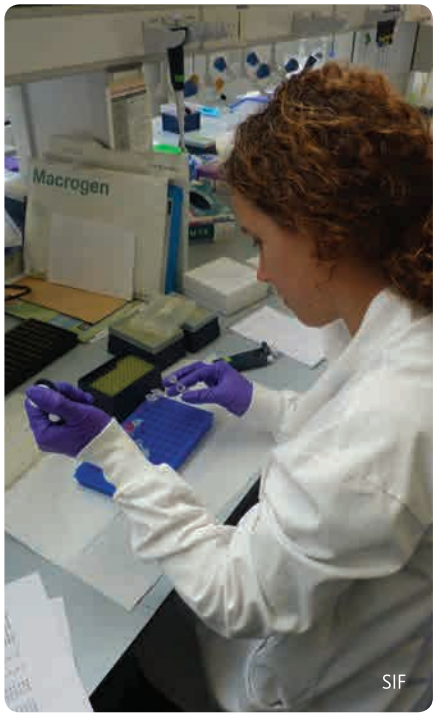
The current research is therefore using genetic analysis to confirm whether the Madagascar Fody and Aldabra Fody have interbred and hybridised, to determine the origin of the invasive fodies and potentially the timing of the original invasion. On a practical side, linking the genetic results with photos of birds will help the team to identify hybrid birds in the field.



Aldabra Rail R Walton

2. Clarification of taxonomic status of the Aldabra Fody and the Aldabra Rail

The research focuses on the Aldabra Fody *(Foudia eminentissima aldabrana)* and the Aldabra Rail *(Dryolimnas cuvieri aldabranus)*. By their appearance and behaviour these two species seem to be sufficiently different to their ancestral populations (i.e. the Aldabra Fody looks and sounds different to other fody species in the region, and the flightless rail has lost its ancestral population's ability to fly) that species status may be more suitable than sub-species status. They are also both the focus



Researcher Dr Janske van de Crommenacker analysing samples in the lab

of conservation management actions and face more immediate threats than the other landbird species. With the current Madagascar Fody invasion in the south-east of Aldabra, and hybridisation between endemic Aldabra and introduced Madagascar fodies strongly suspected, it is important to confirm whether the Aldabra Fody should be considered an endemic subspecies or a full species. Finally there is the symbolic status of these species. As in the case of the Seychelles Black Parrot (see article in Vallée de Mai research section), confirming the Aldabra Rail as a distinct species could also confer financial support and international protection benefits.

Even with good genetic support it is often difficult to prove that a population is a distinct species, as there is no universal definition of a 'species concept' and there are inconsistencies in genetic differences between species and subspecies. It is also unlikely that genetics alone will be sufficient to reach a definitive conclusion; morphology, behaviour and ecology must also be considered. However, what genetic data can do is provide information on whether a population is sufficiently evolutionarily different to warrant treatment as an independent conservation management unit (also called 'evolutionary significant unit'), particularly in combination with the other aspects mentioned above.

In 2013, a number of Aldabra Fody, Madagascar Fody and potential hybrid fody samples were extracted and sequenced for all genetic markers, and the DNA sequences were edited. Additional Mauritius Fody samples were included in the analysis to make the assessment of hybridisation more robust. Labwork will continue into 2014 and results will follow in the next report, together with findings for the Aldabra Rail genetics work.

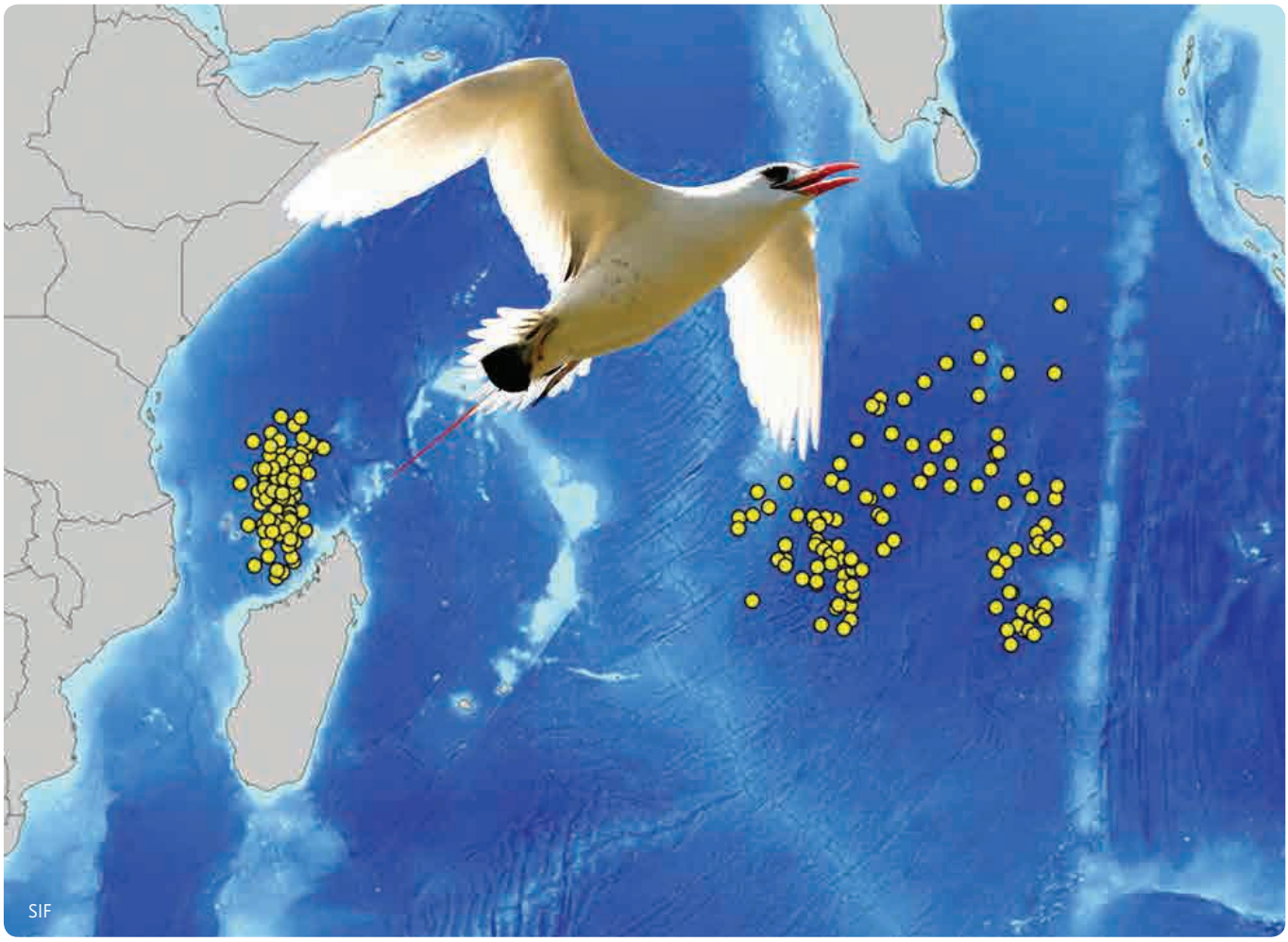
FRIGATEBIRD SURVEY

Seabirds are a key indicator of marine ecosystem health so it is essential that significant populations are monitored. Aldabra hosts the second largest colony of frigatebirds in the world and in 2011 SIF started annual surveys of these colonies. In 2011 and 2012 surveys of the Greater and Lesser Frigatebird colonies on Aldabra were conducted. These surveys were carried out at all four colonies: Passe Gionnet, Camp Frigate, Middle Camp and Grand Poche. The surveys were only initially planned for two consecutive years, but due to large fluctuations in the counts for 2011 and 2012, further surveys were needed to assess the extent of the fluctuations and attempt to understand the factors driving them. The survey has now become an annual event and is part of Aldabra's routine monitoring calendar.

2013's survey estimated 7300 breeding pairs of Lesser Frigatebirds and 4900 breeding pairs of Greater Frigatebirds. This is similar to the 2011 count and an increase of 11% from 2012. The annual fluctuations could be due to varying food availability or a result of the extended frigatebird breeding cycle, which can be more than one year.

An interesting finding from this year's survey was the increase in the number of frigatebirds at Passe Gionnet. In comparison to 2011 this colony had increased by over 100% in 2013. This could be due to several factors, including that the colony is no longer used for tourist viewing; long-term monitoring will be needed to confirm whether the increase continues and the reasons for it.

Frigatebird chick R Walton



TROPICBIRD GEOLOCATOR RETRIEVED

Aldabra supports the largest breeding population of Red-tailed Tropicbirds in the Seychelles. To improve knowledge of their migration ecology and the threats that they are exposed to when away from Aldabra, SIF initiated a study to track the birds, following the donation in 2012 by Dr Jannie Linnebjerg (Universities of Aarhus and Copenhagen) of several light level geo-locaters. These devices use light and time to estimate the bird's location: the latitude taken from day/night length, and longitude from the absolute time of local midday/midnight.

Geo-locaters were deployed on 10 Red-tailed Tropicbirds in the first half of 2012. The devices were attached to a coloured plastic leg ring, with an additional ring on the other leg for identification. The plan was to retrieve the geo-locaters from the tropicbirds when they returned to Aldabra to breed.

In July 2013, more than a year after deployment of the devices, the first geo-locator was retrieved amidst much excitement when a Red-tailed Tropicbird with an orange ring was observed sheltering a young chick. The adult was later caught and the ring and geo-locater removed. Tropicbirds usually return to their previous nesting site and in keeping with this the tropicbird was nesting on the same islet as its previous breeding attempt. The data logger was sent to Denmark in late 2013 for data download and analysis by Jannie.

The raw data from this bird's logger was mapped by Jannie and points from the journey can be seen in the map above (yellow points show approximate logged positions). This bird's logger was attached in May 2012 after which it completed its breeding attempt on Aldabra, and then flew more than 2000 km east to the Chagos Islands area where it stayed from October to December 2012, before returning to Aldabra in early 2013, a round trip of some 5700 km!

The research team on Aldabra is keeping an enthusiastic eye out for other returning birds but several ringed individuals have since been seen without their devices and the chances of retrieving another logger are increasingly slim. For the time being, this bird may therefore provide the only window into tropicbirds' whereabouts when away from Aldabra.

> " This bird made a round trip of some 5700 km. "

Above: Map showing movement of tagged Tropicbird
Below: Red-tailed Tropicbird on a nesting survey


W Falcon

GIANT TORTOISE RESEARCH

The long-term monitoring programme of the Giant Tortoise population on Aldabra continued this year. The database for this programme will be analysed in 2014 by researchers to investigate population trends and status. In addition to the long term tortoise monitoring programme two other important research projects were continued or started in 2013 through the Zurich-Aldabra Research Platform (ZARP) and SIF collaboration.

After two successful field seasons led by ZARP Project Officer Richard Baxter, the first phase of the ZARP and SIF Aldabra Giant Tortoise research project came to an end in 2013. The key overall objectives for the project were: (1) marking, measuring and sampling the Picard island tortoise population to provide baseline data for the island's wild tortoise population; (2) research into Giant Tortoise population dynamics and genetics; (3) linking tortoise densities and behaviour to vegetation dynamics; and (4) linking vegetation dynamics to climate variability and trends.

In 2013, an additional 139 tortoises were 'toasted' with a three letter code on their carapace, bringing the overall number of tortoises marked on Picard to 1143 at the end of the year. As part of the data to construct a 'genetic map' of the tortoises, 307 more blood samples were collected this year making a total of 650 samples, just over half the marked tortoise population on Picard. In addition, over the past two years 103 tortoises have been weighed on Grand Terre, 36 tortoises on Malabar, and 101 on Picard. Grande Terre tortoises (male) were found to be substantially lighter (average of 22.7kg) than Picard tortoises (average of 92kg) which may be due to the harsher environmental conditions of Grande Terre. 'Exclosures' to study the influence of tortoise grazing on vegetation were due to be built this year but logistical problems with obtaining the necessary materials for constructing


SIF

Weighing one of the Giant Tortoises

the exclosure plots have forced us to re-schedule this for 2014.

To monitor tortoise movement on the different islands 31 tortoises had GPS transmitters attached in 2012. These animals were tracked regularly during 2013 and the data from their transmitters

Giant Tortoise with satellite transmitter attached

Map showing the movements of several of the tagged tortoises

downloaded. While there hasn't been enough time for movement patterns to be analysed in detail yet, it is already clear that there are great differences between individual tortoises in total distances moved, as well as area covered since the first tags were deployed in February 2012. Some tortoises move back and forth along a predictable route that can be several kilometres long, on which they stop en route for extended periods in what may be favoured feeding areas. Other tortoises remain within areas of a few hundred metres in diameter over a two year period. For several tortoises, there is evidence of seasonal movements toward the lagoon-side of the atoll in the driest period of the year, especially into the mangrove forests on the east of the atoll or inland to remaining pools of water. These tortoises will continue to be tracked in 2014 and further data analysis conducted.

The ZARP project Officer, Rich Baxter, is now enrolled in the Specialised Environmental Science MSc at the University of Zurich and will be analysing the tortoise movement data for his MSc thesis. He will investigate how ambient temperature and rainfall influences home range size and activity patterns of the tortoises. In conjunction with this, vegetation data will be investigated to find links between food availability and tortoise movement patterns. Analysing home range size will also provide an indication of habitat preference, which is important knowledge for future investigations on tortoise behaviour and vegetation dynamics. The movement data will also be an essential part of developing an individual-based model for tortoise seed dispersal, which is part of a new project on seed dispersal on Aldabra (see next section).

For long-term continuation of the project and capacity building, several SIF staff members were trained by Rich in tortoise marking, sampling, tracking and measuring techniques to continue the project and maximise the information from the tagged tortoises.

INVESTIGATING THE SEED DISPERSAL NETWORK OF ALDABRA

Although there has been substantial research on individual species or groups of species on Aldabra, there has been much less work on the interactions between species and the ecosystem as a whole, which is important to consider for the overall conservation of any natural site. An essential component of any terrestrial ecosystem is the seed dispersal of its plants since this is linked to vegetation stability and recovery. To help SIF understand this on Aldabra, University of Zurich PhD student Wilfredo Falcón started his field research in October as part of the ZARP/SIF collaboration. Wilfredo is using Aldabra, and its vertebrate fruit-eaters and fleshy-fruited

Some of the seed dispersers to be studied on Aldabra


W Falcon

Above: A camera trap set up to monitor a fruiting plant on Aldabra Below: One of the tortoise pens erected to study tortoise gut retention time

plants, as a model system to investigate seed dispersal, from understanding the structure of an entire seed dispersal network to predicting the outcome of interactions. The latter will focus on the likely central frugivore species in the network, the Aldabra Giant Tortoise, aiming to clarify its functional role as a seed disperser in detail. Aldabra is the last place on Earth where Giant Tortoises, which were formerly widespread major seed dispersers, can be studied in near-pristine conditions, providing the impetus for the focus on tortoises as a likely driver of a large proportion of the seed dispersal network. The work builds on and will use information from the first two years of the ZARP research programme under which more than 1000 tortoises were tagged on Picard and 31 tortoises were fitted with GPS transmitters.

Specifically, the project has three closely linked research foci: (1) The structure of the frugivore–plant interaction network of Aldabra; which and how many frugivores eat what and how many fruits? To construct this network, plant–frugivore interactions are being sampled using focal observations, camera traps, and faecal analysis; (2) Where are Giant Tortoises dispersing ingested seeds? To answer this question, researchers will construct and test individual-based models of tortoise-mediated seed deposition. To do this, they will use movement data from the 31 GPS-tagged tortoises, in combination with seed gut retention time data (how long it takes for seeds to pass through the tortoises), and the use of artificial seeds that will be fed to tortoises and tracked after deposition. Finally, (3) What is the effect of Giant Tortoise gut passage on seed germination and seedling establishment? This will be answered with several germination experiments that were started in 2013.

Frugivore-plant interaction network

At the end of 2013, the 15 camera traps deployed on several species of fruiting plants had recorded more than 300GB of plant–frugivore interactions footage. Researchers and SIF staff also contributed by making observations in the field that included tortoises, doves, pigeons, fruit bats and bulbuls eating different species of fruits. Faecal analysis of tortoise dung piles, and from fruit bats has also provided insights into their capacities as seed dispersers.

> " ...more than 1000 tortoises are now marked on Picard and 31 tortoises were fitted with GPS transmitters.. "


W Falcon

INVASIVE SPECIES ACTIVITIES

EU-FUNDED PROJECT

2013 marked the third year of the European Union-funded project by SIF. Invasive species research and project activities expanded throughout the year and made it a very active period for this important project. The intensive phase of the Ring-necked Parakeet eradication on Mahé was launched. Feasibility studies and work for the eradication of rats, cats and sisal from Aldabra began. The introduced bird eradication on Assumption Island had another successful year with another ca. 2600 invasive birds, over 90% of populations, culled on the island by the end of the year. The invasive plant work in the Vallée de Mai made good progress with completion of an important baseline plant survey as well as several experiments being set up. A fourth survey of Yellow Crazy Ants in the Vallée de Mai was also done, and the findings submitted for publication.

ASSUMPTION INTRODUCED BIRD ERADICATION

The Assumption introduced bird eradication, which is being conducted to protect Aldabra's endemic birds, made fantastic progress in 2013. The goal of eradicating Assumption's introduced Red-whiskered Bulbuls and Madagascar Fodies is extremely challenging, especially because no introduced bird eradications at this scale have ever previously been attempted. There are no examples to learn from or lessons we can put into practice, except those drawn from our growing knowledge of the birds and standard invasive species practice.

During 2013, the intensive eradication work continued on Assumption with mist-netting as the main method but shooting was increasingly used to supplement the main catching activities. A third annual survey was completed in October and showed a dramatic decrease in the remaining populations which was very promising and encouraging news for the whole team. By the end of 2012, over 5000 birds had been culled and another approx. 2600 were targeted in 2013 bringing the total close to 8000 birds. The results from the survey suggest that this is over 90% of the remaining populations of these birds. The last 10% of an invasive species, however, as any invasive species practitioner knows all too well, is by far the most difficult to target. The birds are now much less abundant, more aware of the mist-nets and some of them have become noticeably more wary of people. The work in 2014 will therefore require more work with firearms to target individual birds and a team of hunters will be recruited for several months to remove the bulk of the remaining birds.

A major success of this project, eradication progress aside, is its continued training of young Seychellois conservationists in invasive species work. Most of the project staff have been Seychellois including the two Team Leaders in 2013, Julio Agricole and Jessica Moumou (see staff section on p.3-4) They have both done a superb job in getting the eradication to its current point where eradication looks achievable in the next year. The input of international invasive species specialists, such as Pete Haverson (lead hunter), and others, at this later stage of the project is providing the necessary technical expertise and fresh ideas to keep the whole team motivated.

The project has been and continues to be a tremendous learning curve for all involved as well as the wider invasive species community. We very much hope to be able to report success for at least one of the two species in the next annual report.


D Hansen

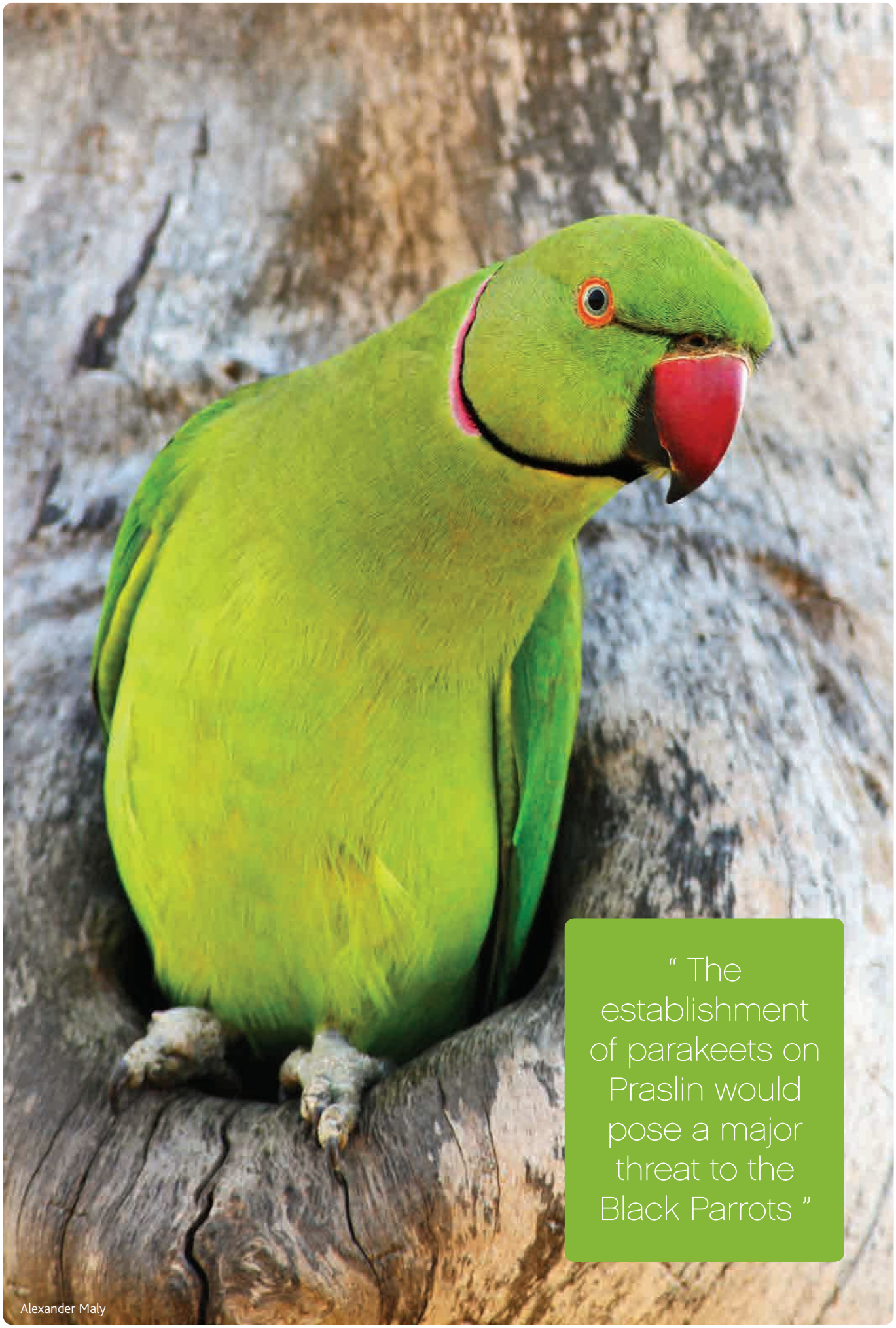
Above: Red-whiskered Bulbul **Below:** Staff conducting observations on Assumption


SIF


Pete Haverson SIF

PROFILE: PETE HAVERSON

Pete Haverson has been SIF's main shooting consultant and expert throughout the invasive species work carried out in the last few years. He was one of the consultants, with Darryl Birch, who launched the Ring-necked Parakeet eradication on Mahé in 2011 and then helped to confirm and finalise the Aldabra goat eradication in 2012. Pete has since been the lead hunter on both the Assumption and Aldabra introduced bird eradications as well as doing more shooting work with the parakeet eradication. He has trained several members of SIF staff in firearms safety and basic air rifle shooting, as well as providing specialist avian shooting training to members of the police and SPDF. Pete is a professional gunsmith, expert marksman and conservation practitioner with many years of experience working in both endangered species management (UK, Mauritius, New Zealand, Bolivia) and invasive species control (Mauritius, Chagos, Socotra, New Zealand). Pete is probably best known in conservation circles for eradicating house crows from Socotra. His advice and training has been instrumental to the success of the projects so far.



" The establishment of parakeets on Praslin would pose a major threat to the Black Parrots "

Alexander Maly

RING-NECKED PARAKEET ERADICATION ON MAHÉ

The invasive alien Ring-necked Parakeet poses the most serious immediate threat to the Seychelles Black Parrot. The Ring-necked Parakeet currently only occurs on Mahé while the Black Parrot's entire global population is restricted to Praslin but the parrot's small population size and very limited range make it very vulnerable, particularly if the Ring-necked Parakeet spreads to Praslin.

The Ring-necked Parakeet is the world's most successful parrot, with a huge native range across Southern Asia and Northern Africa, and an introduced range of more than 35 countries on five continents. An unmistakeable green parakeet with a long tail, a blue and pink collar and a high-pitched repetitive squawk the parakeet has caused many problems across several countries. In Mauritius, it transmitted a novel virus to Critically Endangered Echo Parakeets which caused huge setbacks in the conservation management of this endemic species for several years. In Australia, the species is flagged as a potential major agricultural pest which could cause substantial financial losses to farmers. The parakeet is also known to have negative impacts on native birds in Europe.

The parakeet was most likely introduced to Seychelles in 1996, when only two captive birds are reported to have escaped. These birds quickly bred and, although there were major control efforts by the government, the population re-bounded and, by the beginning of 2013, stood at well over 300 birds. Although currently established only on Mahé there is a real danger that the parakeets could spread to and establish on other islands in Seychelles (single birds have already reached Praslin and Silhouette). The establishment of parakeets on Praslin would pose a major threat to the Black Parrots, as they have the same nesting requirements and similar feeding preferences, so competition for food and nesting sites would probably result in difficulties for the Black Parrots. Moreover, if the Ring-necked Parakeet transmits any diseases which the Black Parrots have not been exposed to, the outcome could be catastrophic for the national bird of Seychelles. Farmers also have problems of their own with this highly invasive species. An eradication programme to remove this destructive parakeet from Mahé has long been planned and, following preparation work over 2 years, the eradication was finally launched by SIF and the Ministry of Environment under the EU project in July 2013. The project is also assisted by the Police Special Security Wing and the Seychelles People's Defence Force, who have both provided staff to attach to the project as escorts. The collaboration of all of these agencies has been crucial to getting this project off the ground and SIF is extremely grateful for their strong support.

Poster used on Mahé in a campaign to reach out to members of the public

There has never been a successful eradication of the Ring-necked Parakeet, although the species is locally controlled in many countries. Eradication is fortunately still considered feasible in Seychelles because of the relatively small population size and restriction to one island but Mahé is still a large and topographically challenging site for an avian eradication so project success will depend as much on public contribution and support as it does on the team itself.

A new team of three SIF staff is now in action, targetting parakeets using mist-netting and shooting, and gathering information on their location, movements and distribution. By the end of 2013, the team had targeted 67 birds and had assessed several methods. Shooting has been shown to be the most effective removal method for this species so this will be intensified in 2014. A vital part of the team's work is reaching out to members of the public and agricultural sector, as well as schools, on Mahé to gather information and explain the importance of the project. So far the support from the public, the agricultural sector and schools has been overwhelmingly positive, which will make a substantial difference to the chances of success of this pioneering project.

If you live in Seychelles please contact SIF if you want more information on this project, or if you would like to report groups of Ring-necked Parakeets regularly seen near you.

Left: Vya Tang, one of the invasive plant species that is being targetted **Right:** Leaf litter experiment in the Vallée de Mai

CONTROLLING INVASIVE PLANTS IN THE VALLÉE DE MAI

In early 2013, the Praslin invasive species team completed a comprehensive plant survey of introduced and native plants in the Vallée de Mai and surrounding area of the Praslin National Park that was started in 2012. The survey has provided essential baseline data on the abundance and distribution of plant species in the palm forest. In total 93 plant species were recorded in the survey, 49 of which were introduced species and 44 native species. Although over 50% of the plant species recorded in the Vallée de Mai have been introduced, their abundance is substantially lower than in areas outside the Vallée and many introduced species are not considered invasive. Moreover, the equivalent figure for the overall proportion of introduced plants in Seychelles is considerably higher (>70%). The palm forest habitat is therefore one of the least invaded habitats in the country and controlling invasive species will contribute tremendously to plant conservation in Seychelles.

The survey also helped to determine which of the invasive plant species are most prevalent and pose the greatest threat to the endemic biodiversity of the Vallée de Mai. Following this survey, preparation and research into the most effective control for the main invasive species threats is ongoing and active control will be started in 2014.

Also in 2013, three experiments were established to shed light on the dynamics of the forest ecosystem in the Vallée de Mai and provide a basis for effective management of invasive species there. The aim of the first experiment is to determine how the creation of gaps in the forest canopy (e.g. when introduced trees are removed) affects the regeneration of native or introduced plants. In a second experiment the effect of different types of leaf litter on seed germination and growth of native and invasive species is being tested. The third experiment is a herbicide trial to identify the safest, most efficient way to control invasive trees in the Vallée de Mai, without affecting the forest ecosystem and its function (e.g watershed). The experiments are being monitored regularly and will conclude in 2014. The results will be used to help design a habitat management plan for the Vallée de Mai and surrounding area in collaboration with the Seychelles National Parks Authority.

YELLOW CRAZY ANT SURVEY

Yellow Crazy Ants are one of the most notorious invasive species in the world, having been responsible for catastrophic ecosystem 'meltdowns' on other islands. They were first recorded in the Vallée de Mai in 2009 and since then several surveys have been conducted to monitor the population's abundance and spread. In 2013 two surveys were conducted in April and in November to map the distribution of the ants within the Vallée de Mai in two different seasons. The good news is that the distribution of this usually highly invasive ant seems to have remained stable in the palm forest, and the population remains confined to the north-eastern part of the Vallée de Mai. Throughout the surveys, conducted between 2010 and 2013, small fluctuations of ~30% have been recorded in the abundance and distribution of these ants, with the highest numbers in the north-eastern corner of the Vallée. In the most recent surveys, as in previous surveys, ants appear in new sites, while disappearing from others, suggesting that their expansion in the Vallée de Mai is being constrained. The causes of this lack of expansion remain unknown at the moment but are discussed in a manuscript on the results of these surveys and the impacts of the ants, which is currently being processed for publication.


Yellow Crazy Ant C Mason-Parker

Although the results indicate that the ants are not spreading rapidly as they do elsewhere, their occurrence and fluctuating population and distribution remains a cause for concern. SIF staff will continue to monitor these tiny but destructive predators to protect the flora and fauna of the Vallée de Mai, and research into control will be carried out as action may become necessary to reduce the numbers.


M van Dinther


M van Dinther

PREPARATION FOR SISAL ERADICATION ON ALDABRA

Work on one of the most invasive plants on Aldabra, Sisal, intensified in 2013. Sisal is a large succulent plant originating from Central America but was introduced to Aldabra, possibly for its tough hemp-like fibres. The species spreads either vegetatively via roots or from fertilised plantlets called bulbils which are produced in their thousands during the single flowering period. Although these dispersal methods mean that sisal's spread is relatively slow, dense impenetrable thickets eventually form if it is not controlled. The species totally dominates the vegetation once it has taken hold and out-competes native flora, decreasing habitat availability and biodiversity as well as the food sources for wildlife.

Fortunately Sisal on Aldabra is not widespread and efforts to remove Sisal patches have been ongoing since the 1970s. The applied mechanical method (uprooting, removal, and burning of plants) has been very successful in areas that staff reside at or are very regularly visited (e.g. the area around Picard Settlement). However, the hard porous limestone structure of the atoll allows roots to grow deep in between the rock, making it difficult to remove the plants completely. This has resulted in the re-sprouting of plants after initial removal in several locations around the atoll and requires a continuous effort to control these patches.

Monitoring of known patches of Sisal has been ongoing for some time and in 2013 an extensive survey was conducted of areas on Aldabra where Sisal is known to have occurred, plus areas where it has never been reported. The survey resulted in the discovery of an unknown patch of Sisal on Picard. From this survey Sisal is presently known to occur at three locations on Aldabra; Picard, Ile Michel and Anse Polymnie.

Once the locations had been identified, extensive research was carried out by Invasive Species Technical Officer Martijn van Dinther into various eradication and control techniques for Sisal. Chemical control or eradication using herbicides has been proven to work in many invasive plant eradication programs. Herbicides, when applied correctly, will also reach the difficult to remove roots and could lead to complete eradication of this invasive plant from Aldabra. However, despite the success of herbicide in other eradications it was not known what the most effective method of herbicide application would be on Aldabra, and it was essential to avoid any non-target effects of herbicide application. So in 2013 a trial was established using several different control methods including varying strengths of herbicide, to determine which would be the most effective and practical strategy for an island-wide eradication of Sisal from Aldabra. The trials will be concluded in 2014 and the most effective method will be used to start the eradication.

Above Left: Dense sisal patch at Ile Michel **Above Right:** Sisal plant with flowering stem **Below:** Invasive Species Technical Officer Martijn van Dinther and Ronny Gabriel conducting herbicide trial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RAT AND CAT ERADICATION FEASIBILITY STUDY STARTED ON ALDABRA

A feasibility study for an eradication of Black Rats and Feral Cats from Aldabra Atoll kicked off in January 2013, led by project consultant Dr Grant Harper and Invasive Species Technical Officer Martijn van Dinther. Black Rats have been identified as the most damaging invasive rodent to island ecosystems, and rats in general are associated with the greatest number of declines or extinctions of native island biota. To fully protect the unique terrestrial endemic biodiversity of Aldabra it is crucial that this species is eventually removed from the atoll. The feasibility study has four main themes to research: (1) the impact of rats and cats on the native fauna and flora of Aldabra; (2) the population biology of the two species; (3) effectiveness of target methods and potential non-target impacts; and (4) the feasibility of cat and rat eradication on this large isolated atoll.

Throughout 2013 trapping was conducted every 4 months to gather information on the relative abundance, population structure, breeding status, morphometrics and diet of rats in the three main habitats on the islands of Picard, Malabar and Grande Terre. A basic comparison of the trapping conducted on the main three islands revealed interesting results. Mangrove forest appears to be a particularly good habitat for rats with larger recorded body sizes, larger juveniles and better body condition than rats trapped in drier habitats. Part of the diet of these 'mangrove' rats is composed of snails which gives them an advantage over 'terrestrial' rats as they are available year round. Also the rats captured at Grand Terre were significantly smaller and lighter than the rats from Picard which is possibly related to the presence of predatory cats on Grande Terre.

To estimate the population density of the rats, a mark-recapture method was used in three trapping grids on Picard. Captured rats were marked with numbered metal fingerling tags in the right ear to recognize them on recapture. Their weight, size and sex were also recorded. The trapping on Picard was repeated three times throughout the year to investigate seasonal changes and assess the best time for an eradication. During 2013, 316 individual rats were marked and caught a total of 2532 times in 5160 'trap nights'. Analysing the results of this trapping there was no detectable seasonal decline in rat population density or body condition on Picard through the dry season of 2013. This suggests that sufficient fresh water and food resources are available to maintain individual body condition and population numbers year round.

Compared to rats, trapping cats is more challenging and in 2013 a total of 12 cats were caught on Grande Terre (the only island with cats on Aldabra). Most cats caught were in poor body condition

M van Dinther

Left: Dr Grant Harper and ISTO Martijn van Dinther at a rat nest in the mangroves Middle: Trainee Field Research assistant Jeremy Raguain secures a metal tag to the captured rat's ear Right: A captured rat is released from a trap, with a metal tag in its right ear

with none to very little body fat. The cats caught on the beaches of West Grand Terre, however, were very healthy, probably because their diet appeared to consist mainly of Green Turtle hatchlings.

The most common and proven successful technique in eradicating rats from islands is to distribute poisonous rat bait. Trials with coloured non-poisonous bait showed that bait would readily be eaten by several non-target species like Giant Tortoises, hermit and Coconut Crabs. Although none of these species are harmed by eating the poisonous bait (which is designed for mammals), they do remove the bait before rats can find and eat it. Our trials with different bait deployment amounts, and subsequent trapping in a baited area, showed that the spread of 15kg per hectare is sufficient for all rats to find and eat the bait.

Ultimately, the results from all of this research will be compiled by Grant to produce an eradication feasibility assessment for Aldabra. The work so far is fairly promising but Aldabra presents a unique combination of challenges to a successful eradication, including its size, terrain and almost pristine terrestrial biodiversity. Most of these obstacles can be overcome with careful planning but the most difficult problem envisaged is the presence on Aldabra of huge areas of mangrove forest, where tidal fluctuations will flush out any deployed poison. Until there is a solution to this, it will not be possible to attempt an eradication, but one of the plans for 2014 is to test methods of bait deployment in mangroves to examine uptake in rats and find out if methods can be developed on a larger scale. If this is possible, a future Aldabra without any invasive mammals, and a rosier outlook for many of the atoll's native species that are affected by rats and cats, will look increasingly likely.

> " 316 individual black rats were marked in the mark-recapture study in 2013. "

United Nations Educational, Scientific and Cultural Organization

World Heritage Centre

UNESCO FUNDED ERADICATION ON ALDABRA

SIF

MADAGASCAR FODY ERADICATION ON ALDABRA CONTINUES

The eradication of introduced Madagascar Fodies and Red-whiskered Bulbuls from Aldabra continued in 2013 and was successfully concluded for the bulbul (see next section). The Madagascar Fodies have a much larger population and are well-dispersed across the Takamaka region of Grand Terre, making them a much tougher job to eradicate.

The new Takamaka hut, built in late 2012, did a super job of hosting the team comfortably, if rather cosily, for the season. UNESCO funding enabled us to recruit and deploy a team rapidly in January 2013 to start reversing the invasion while it was still possible. This eradication is only active during the fody breeding season, because the introduced fody is too difficult to distinguish from the endemic Aldabra Fody in the field during the non-breeding season, when the fodies lose their colourful breeding plumage. Intensive eradication efforts were therefore carried out from January to April and then resumed at the end of 2013, when breeding started again.

A comprehensive survey of the entire area was carried out and the team was able to map the boundaries of the invasion and concentrate their efforts within this area. By the end of the first season more than 100 Madagascar Fodies had been culled, which included some potential hybrid birds (see article on hybridisation in Aldabra research section, p.27). Aldabra Fodies were also caught, ringed and sampled, so they could be identified at a distance and included in the genetic research. Although the population, including the potential hybrid birds, is larger than expected, this was fantastic progress for the first season and the team were confident that their efforts had made a substantial difference to halting and reversing this invasion.

Above: A newly ringed and sampled Aldabra Fody
Below: The team in the cosy new Takamaka hut


SIF

Further seasons of eradication work will be essential to complete this ambitious task and the current season is ongoing into 2014. This eradication has a labwork component with genetic research also underway to confirm hybridisation and help the staff to distinguish the hybrids in the field. It is a strong combination to have lab and field work so closely connected in the same project, and 2014 should bring more positive news on both fronts.


SIF

Terence Mahoune with the single Red-whiskered Bulbul on Aldabra

RED-WHISKERED BULBUL ERADICATED FROM ALDABRA

In July 2013 Takamaka Introduced Bird Eradication Team leader Terence Mahoune, and Field Research Assistant Jeremy Raguain visited the Takamaka area to observe the introduced Madagascar Fody population there, and to seize another opportunity to try and catch the elusive Red-whiskered Bulbul, which had thwarted all previous attempts at capture. The 'population' of this species on Aldabra was thought to be a single bird but this was only possible to confirm by catching it.

Fortunately the Red-whiskered Bulbul was still using its previously identified home range and roosting area at Takamaka. Mist-netting at roost sites is a highly effective capture approach on Assumption, so the team narrowed down the bulbul's roosting area and set up mist-nets, which, to their jubilation, were successful on only the second day of the trip! As a result, within Seychelles, the Red-whiskered Bulbul once again occurs only on Assumption, where it is also in the process of being eradicated.

Native to Asia the Red-whiskered Bulbul has now been introduced to many parts of the world and was introduced to Assumption in the 1970s from Mauritius (where it was also introduced and is now the most abundant bird species). The Assumption eradication was started to prevent these two introduced bird species from reaching Aldabra. In March 2012, it was confirmed that at least one Red-whiskered Bulbul had reached Aldabra. It is highly likely that this bird flew or was blown by strong winds from Assumption (27 km SE of Aldabra). Takamaka, in the south-eastern part of Grand Terre, is the area of Aldabra closest to Assumption.

Considering the sheer size and physical environment of Aldabra, trapping a single bird was only possible after many months of searching, careful observations and effective planning. Attempts to catch this bird, alongside work to catch Madagascar Fodies, were ongoing for nearly a year, and involved intensive and diverse efforts by the team. These efforts demonstrate the commitment required and the difficulty of targetting the final individual in an introduced bird eradication. Observations since the bird's capture have confirmed that this was indeed the only Red-whiskered Bulbul in this area of Aldabra. Other areas of Aldabra are visited regularly and are known not to host any introduced bird species. Thus, with the capture of this bird the SIF team has achieved the second introduced species eradication from Aldabra within a year, following the success of the feral goat eradication in August 2012.

More details and the outcome of both the Red-whiskered Bulbul and Feral Goat eradications have now been published in the IUCN Aliens Bulletin:

Bunbury N, Mahoune T, Raguain J, Richards H & Fleischer-Dogley F. (2013). Red-whiskered bulbuls eradicated from Aldabra. Aliens: The Invasive Species Bulletin 33: 8-9

Bunbury N, von Brandis R, Currie J, Jean-Baptiste M, Accouche W, Souyave J, Haupt P & Fleischer-Dogley F. (2013) Goats eradicated from Aldabra Atoll, Seychelles. Aliens: The Invasive Species Bulletin 33: 18-22

EDUCATION & OUTREACH

2013 has been another successful year for the Education and Outreach programme. Educational activities continued in local schools and membership in the Friends of Vallée de Mai club remained high. A total of 16 outreach events were participated in, reaching around 2500 people. Highlights of the year included the National Expo, World Environment Day and a focus on the awareness of invasive species.

EDUCATION

FRIENDS OF VALLÉE DE MAI CLUB

In 2013 there were 106 children enrolled in the Friends of Vallée de Mai club from all four schools on Praslin. This is around 20% of the schoolchildren on Praslin and many were repeat club members. The Education and Outreach Programme Officer attended each club's extracurricular sessions once a month to provide direction and support to the club leaders. In addition, many other educational activities were organised for club members throughout the year.

SCHOOL PRESENTATIONS AND VISITS

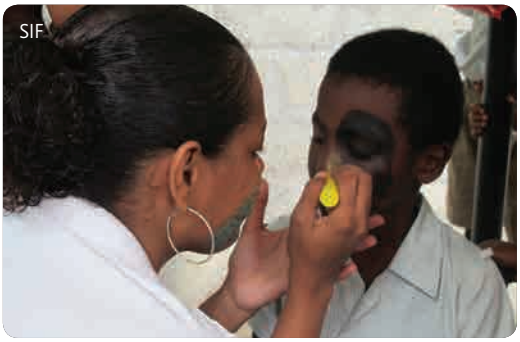
The Education and Outreach Programme officer gave 15 presentations in six different schools on Praslin and Mahé this year. The presentations were on a variety of subjects including Birds of Seychelles, Black Parrots (usually accompanied by Rio, the hand reared parrot), sustainable living, history of Coco de Mer and the threat of poaching. A survey conducted in the primary schools of Praslin also found that 68% of the children in their final year of primary school had visited the Vallée de Mai. For several years SIF has been conducted these surveys and organizing for the primary school children to visit the Vallée at least once. It is rewarding to see that through the SIF education and outreach programme more children are visiting the Vallée every year.

EARTH DAY

SIF attended a one-day event held at the University of Seychelles Anse Royale campus and organised by Wildlife Clubs of Seychelles on 22nd April. The event aimed to engage local school children in various activities concerning the environment. There were drama, song and creative writing workshops as well as a small fair. On the SIF stand blank postcards were distributed and children were asked to write messages and draw pictures about climate change. Around 50 children participated in the activity. These postcards were then sent after the event to the President of Seychelles, James Michel. He was so pleased to receive them that he invited some of the children to State House to discuss climate change further. They were greeted with an informal discussion with the President on the effects of climate change in the Seychelles and the importance of protecting our environment. The President also spoke of his admiration and pleasure that the youth of the Seychelles were involved in such key environmental issues.

Postcards produced by students at Earth Day activity

Coco de Mer anti-poaching rally on Praslin. Below: Face painting at World Environment day activities



WORLD ENVIRONMENT DAY

On 5th June SIF celebrated World Environment Day at the Vallée de Mai with a wide range of environmental education activities. The day began with a rousing rally to raise awareness in the local community of the threat Coco de Mer face from poaching. A group of around 100 primary and secondary school children, teachers and SIF staff equipped with banners that read 'Protez nou koko-de-mer!' and 'Aret vol koko-d-mer!', marched through the streets of Praslin to the Vallée de Mai chanting and singing. The children thoroughly enjoyed themselves and the rally had a festival-like atmosphere. Once they arrived at the Vallée de Mai, the day commenced with the children participating in several activities at the visitor centre; face painting, creative writing, art, presentations from SIF staff on subjects such as 'Life on Aldabra', 'The Black Parrot', 'The Importance of Coco de Mer'. Other children were taken on guided tours around the Vallée de Mai, where they learned first-hand from knowledgeable SIF staff and invited guests about the biodiversity and uniqueness of the forest. There were also some competitions to participate in; a general trail quiz through the forest and an invasive species fact finding trail. These quizzes were very popular and the children, and tourists alike, had the opportunity to win some great books. The day ended with an official prize-giving ceremony for the Coco de Mer poaching awareness competition that had been launched previously in the schools on Praslin. Members of the 30th anniversary Vallée de Mai committee were on hand to present the prizes to the children for the poster, poem and song categories and some of the participants recited their poems and performed their songs. Three other children from Pointe Larue school on Mahé also attended to give a moving speech on Coco de Mer poaching. This speech had won first prize last year in a public speaking school competition.

NATIONAL DAY EXPO

The three-day National Day Expo held from 16th – 18th June was part of national celebrations to showcase commerce and activities of Seychelles. SIF participated as part of the 'Eco-village' organised by the Ministry of Environment and Energy. The Eco-village was an area dedicated to all the organisations in the Seychelles who were involved in environmental conservation and education. It was a fantastic opportunity for many organisations to come together and give information on their critical work and research. The SIF stand attracted a large audience over the three days with an estimated 1000 people visiting. The stand itself exhibited both of SIF's World Heritage Sites with items from the Vallée de Mai on display, such as Coco de Mer nuts. There was also a section dedicated to the EU funded invasive species work with information and equipment on the Ring-necked Parakeet eradication project, and information and a framed goat skin from the Goat eradication project on Aldabra. All of these displays generated a great deal of interest from the public, with SIF staff on hand to answer any questions they might have. However, the main attraction of the stand was the two interactive games that were available. Using two Giant Tortoise shells from Aldabra, participants were asked to identify the sex of each tortoise for the chance to win a prize. Many suggestions and theories were put forward as to how to identify the sex of the tortoises much to the amusement of the participants. There was also a game where participants were asked to identify the age of three Black Parrot chicks using photos for identification. This was a hard task but there were still some winning entries. Overall, the games provided a fun and interactive forum for SIF to engage and educate the public about their World Heritage Sites and the work that is being conducted in them.

The SIF stand at the National Expo SIF

SEYCHELLES SEA TURTLE FESTIVAL

The first Seychelles Sea Turtle Festival was held on 9th and 10th August to celebrate marine turtles and raise awareness about their conservation. SIF along with other local NGOs supported and participated in the two-day event. The festival began with an opening ceremony, held at the Ministry of Education. It was attended by schoolchildren from across Mahé as well as representatives from all the attending organizations. The ceremony featured presentations from leading scientists and conservationists in Seychelles. Alongside these presentations prizes were awarded to children that had participated in an artwork competition held in the schools.

Children from La Rosière Primary school performing at the Sea Turtle Festival

There were also poems and stories read by the students, a turtle song sung by children from La Rosière primary school, and an impressive short animated film 'The Incredible Journey of Telsy the Turtle' created and performed by students from the 'Academy by the Sea' (an MCSS and SOSF initiative).

The second day was a family fun day held at Beau Vallon beach. SIF along with other conservation organisations hosted stands with a variety of fun kids activities such as face painting, turtle crafts, pin the tail on the turtle, learning turtle survey techniques as well as a great deal of information about turtle conservation and ways to get involved. The event attracted many people throughout the afternoon and there was a great festival atmosphere. With a large population of Green and Hawksbill Turtles at Aldabra, SIF was proud to be an integral supporter of this festival that highlights the importance of sea turtle conservation.

SUBIOS

'SUBIOS – Seychelles' festival of the sea' is an annual event held from 23rd to 24th November to celebrate the exquisite marine world of the Seychelles. The three-day festival was an opportunity for SIF to join with other marine focused NGOs (Save our Seas Foundation, Academy by the Sea, GVI Seychelles, Seychelles Sea Turtle Festival) to host a stand at the children's day event at Beau Vallon beach. The stand not only showcased the various marine conservation and education activities that each organisation is conducting, but also provided lots of marine themed crafts and activities for children. The SUBIOS festival also included an underwater photography competition, presentations from local marine scientists and videos showing the beauty of the underwater world of the Seychelles. The festival and associated events are important in educating and instilling a passion and pride for the marine world of the Seychelles in both children and adults alike.

SUBIOS festival SIF

A member of SPDF helping to remove invasive plants

COMMUNITY ASSISTED REMOVAL OF INVASIVE ALIEN PLANTS

On August 26th staff of the Seychelles Peoples Defence Force and 12 staff from the Seychelles National Parks Authority came to the Vallée de Mai and worked alongside SIF rangers and fieldworkers in a coordinated effort to combat invasive plant species in a designated area.

The day was organised as part of the events leading up to the 30th anniversary of the Vallée de Mai as a UNESCO World Heritage Site in December 2013. The objective of the event was to clear an area bordering the Vallée de Mai of invasive creeper plants such as 'Devils Ivy' and Philodendron whilst educating local school students about the problems of invasive species.

Clearing the creepers from a substantial area was a challenging task but the many helping hands did an amazing job in the field, managing to clear a substantial area. On returning to the cleared site just one week later masses of dying creepers could be seen, showing that the work was truly worthwhile. Without help, this result would have taken weeks to achieve so we are extremely grateful to the Seychelles Peoples Defence Force and the Seychelles National Parks Authority for their support and the great teamwork of all staff who contributed on the day.

Alongside the clearing action, educational activities were run for Praslin school children. Students were given a presentation on invasive alien species by SIF staff. They then took part in a trail walk to see some of the invasive species threatening the Vallée de Mai, such as Cinnamon, Jackfruit, Yellow Crazy Ants and Kalis Dipap. While the children were in the forest they were also shown the different experiments being carried out by the team.

CLEAN UP THE WORLD DAY

As part of the national Clean up the World activities taking place in Seychelles on 21st September, SIF organised a clean up activity at the Vallée de Mai. The theme of this year's 'Clean up the World' event was 'Our Place, Our Planet, Our Responsibility' and with that in mind SIF staff from the Vallée de Mai and Head Office joined together with many local groups and organisations to continue removing the invasive plant creeper, 'Devils Ivy' or Philodendron, from the border of the Vallée de Mai. Despite the best efforts of SPDF earlier in the year, the creepers need to be continuously controlled as they pose a threat to the endemic palm forest of the Vallée de Mai; they grow rapidly, smothering their host plants, preventing them from feeding and growing by blocking the light, and can eventually kill them. The creepers are resilient and can dominate habitats – as can already be seen in many places on Mahé. Removing the plants is hard work as they are thick stemmed and cover large areas. The participants removed the creepers and then placed them on drying racks, where they will stay until there is no chance of re-growth. Once dried, they can be put back on the forest floor, where they will decay naturally. The day was a great success, with over 60 people of all ages participating in the clean up activity and successfully clearing a large area.

SIF staff members assisting in the removal of invasive plants

Above: Participants at the SIF holiday camp
Below: One of the holiday camp students with a Seychelles Tiger Chameleon

SIF HOLIDAY CAMP

SIF held its fourth holiday camp this year, with 26 children from 4 to 16 years old attending the five day educational camp at the Vallée de Mai. This camp is an opportunity for the children to learn about the two World Heritage Sites of Seychelles and their wildlife, and other topics about the environment and personal well-being. The camp aims to further the children's environmental knowledge and engage them in the natural world.

This year the holiday camp covered a variety of activities and topics which were a mixture of theoretical sessions such as presentations and worksheets, but also more practical hands on sessions. One topic that was covered was insects; they received a presentation on insect biology and then got out of the classroom and into the forest to see some insects in their natural habitat. They looked for insects in the rivers and by the trails and were excited to find several different species. They also had the chance to see and learn about Yellow Crazy Ants, which are an invasive species to Seychelles, and the problems they can cause within the forest. Some of the staff from the SIF Praslin invasive species team took the children on a fact-finding trail in the forest. On the trail they learnt about some of the other invasive species that can be encountered in the Vallée de Mai, such as Rats, Tenrecs and Cinnamon trees. They were taken on a dusk safari which was very popular and the children were lucky to see many endemic species, including a rarely spotted Sooglossid Frog. Earlier in the day they had also seen the Giant Bronze Gecko and the Seychelles Tiger Chameleon. For many of the children it was the first time they had seen these animals so this was a really memorable experience.

SYMPOSIUMS AND WORKSHOPS

RESEARCH SYMPOSIUMS

Two symposiums were held this year on Mahé (4th April) and at the Vallée de Mai to share knowledge, results and best practices with the local scientific community. These symposiums were part of the year long celebrations of the Vallée de Mai's 30th anniversary as a UNESCO World Heritage Site. The symposiums presented the latest information and findings by SIF on the Coco de Mer, cutting edge research into the Black Parrot, research into invasive species, and details on a potentially new species of sooglossid frog. Around 90 people attended the symposium on Mahé from a variety of government departments, businesses and NGOs. The symposiums received a great deal of positive feedback and we will look to hold similar events in forthcoming years.

INVASIVE SPECIES WORKSHOP

This workshop was held at the Vallée de Mai on 7th November and was hosted by the Praslin invasive species team and staff from the Assumption eradication project. The workshop was led by Lauren Koehler, who has worked extensively on invasive species eradications on islands and had spent the past six months working on the SIF invasive bird eradication project on Assumption Island. More than 30 participants from Curieuse, Cousin, Aride and La Digue as well as Praslin and Mahé attended the workshop from several organizations namely GVI, ICS, SNPA, the Environment Department and Nature Seychelles. Lauren gave an overview of why invasive species management is needed and presented work from and showed videos of invasive species eradications on Macquarie and Raoul Islands in the Pacific Ocean. The presentations were followed by an open discussion on problems related to invasive species in which participants were encouraged to talk about invasive species issues at their respective sites and the impacts, as well as work being done to control these species.

BLACK PARROT WORKSHOP

This workshop was held at the Vallée de Mai and at the University of Seychelles on Mahé on 19th November. The workshop was organized in relation to the DARWIN-funded initiative 'EDGE' to advance knowledge on rare and distinct species in Seychelles, which include the Black Parrot. Participants learned about current fieldwork on the parrots from the Vallée de Mai rangers, and Dr Jim Groombridge from the Durrell Institute of Conservation and Ecology the University of Canterbury, Kent presented results of the genetics work being conducted on the Seychelles Black Parrot and conservation measures and current research on the Black Parrot were discussed. At the Vallée de Mai workshop, Terence Payet, a Ranger at the Vallée de Mai, also presented to the participants the results of the last few years of Black Parrot research by SIF.

Participants at the Black Parrot workshop

VIP VISITS

The President of Sri Lanka Mr. Mahinda Rajapaksa in the Vallée de Mai SIF

PRESIDENT OF SRI LANKA VISITS THE VALLÉE DE MAI

The President of Sri Lanka, Mr. Mahinda Rajapaksa visited the Vallée de Mai on Praslin in July to experience the natural beauty of this UNESCO World Heritage Site. President Rajapaksa was accompanied by Vice President Danny Faure and Minister Mitzy Larue and was welcomed to the Vallée de Mai by the Chairman of SIF, Ambassador Loustau-Lalanne, CEO Dr Frauke Fleischer-Dogley and all of the SIF Vallée de Mai staff.

Dr Fleischer-Dogley accompanied the President on a brief tour of the visitor centre after which they spent some time in the forest. The President was keen to see where the Coco de Mer originated from as he had planted a Coco de Mer nut that morning at the Barbarons Biodiversity centre on Mahé. The President had the opportunity to see both the male and female Coco de Mer trees and a staff at the Vallée de Mai demonstrated the de-husking of a giant Coco de Mer nut. Both Ambassador Loustau-Lalanne and Dr Fleischer Dogley explained to the President the importance of this forest to the biodiversity of the Seychelles and why it was so unique. The President commemorated his visit by signing in the visitors' book at the entrance gate to the forest and commented that 'This forest is exceptionally beautiful and I am very impressed with the site.'

Ambassador Loustau-Lalanne also shared with the President a description of the recent anti-poaching rally that

was held at the Vallée de Mai to celebrate World Environment day. The President was interested and pleased that such events were being held and supported by the local community. Furthermore, Vice President Faure spoke to President Rajapaksa about the importance of environmental conservation in the long-term development strategy of Seychelles.

STAFF TRAINING & MOVEMENTS

SIF continued their staff capacity building this year with Professor David Stoddart Scholar Annabelle Constance in her second year of her BSc in Environmental Science at the University of Seychelles. SIF also heavily invested in staff training at Aldabra and the Vallée de Mai. Despite the logistical difficulties of training on Aldabra more than 50% of staff were trained in scuba diving in preparation for their participation in the marine monitoring programme.

STAFF TRAINING

OVERSEAS TRAINING

February	Marc Jean-Baptiste	Training with Durrell Conservation Academy on Chameleons, Rodrigues
May	Marc Jean-Baptiste, Joel Souyave	UNESCO Site manager workshop on Risk Preparedness, South Africa
November	Terence Payet	Training on Echo Parakeet programme with Mauritian Wildlife Foundation, Mauritius
December	Christina Quanz	Island systems - Decentralized, autarkic energy concepts with Sunny Island at the Solar Academy in Germany

DIVE TRAINING

March	Samuel Bassett, Murvin Green, Ian Mellie, Richard Baxter, Barney Marengo	PADI Open Water course
	Samuel Bassett, Murvin Green, Ian Mellie, Richard Baxter, Janske van de Crommenacker, Martijn van Dinther	PADI Advanced Open Water course
	Richard Baxter, Janske van de Crommenacker, Martijn van Dinther, Lotte Reiter, Arjan de Groene, Unels Bristol, Christina Quanz	PADI Rescue Diver course

OTHER

March	Ian Mellie, Richard Baxter, Janske van de Crommenacker, Martijn van Dinther, Lotte Reiter, Arjan de Groene, Unels Bristol, Joel Souyave, Alain Banane, Jude Brice, Christina Quanz, Barney Marengo, Murvin Green	Emergency First Response course
April	Dainise Quatre	Coral communities workshop with Earthwatch on Curieuse Island
July	Terence Payet, Natachia Pierre	Education and Awareness workshop with ZSL EDGE programme
December	Dainise Quatre	Coral Reef monitoring training with SNPA and GVI

STAFF MOVEMENTS

May	CEO	WIOMSA workshop, Zanzibar
June	CEO	Meeting with ZARP researchers in Zürich
August	Science & Projects Programme Coordinator	Microsoft Research, Cambridge, UK for training in 'Mataki' GPS tracking devices
September	Science & Projects Programme Coordinator	University of Zurich for 2 days of research meetings and discussions concerning the Zurich-Aldabra Research Platform (ZARP) ETH Zurich to discuss Coco de Mer research
October	CEO	Second UNESCO World Heritage Site Managers Conference, Corsica
October	CEO	Third International Marine Protected Area Congress, Marseille

EDGE Fellow Terence Payet

IN FOCUS : EDGE FELLOWSHIP

In 2013, Terence Payet, an SIF ranger at the Vallée de Mai, continued working as a fellow for the Seychelles Black Parrot. He is a fellow under a project funded by the Darwin Initiative - 'A cutting-edge approach to saving Seychelles evolutionary distinct biodiversity', which aims to raise awareness of and conserve Seychelles' most Evolutionarily Distinct and Globally Endangered (EDGE) species. EDGE species have few close relatives and are extremely distinct in the way they look, live and behave. The EDGE Fellows programme aims to create a new global network of in-country conservationists trained in cutting-edge wildlife management techniques and well-equipped to design and implement a project for a local EDGE species.

DARWIN INITIATIVE

Terence will be part of a four-year programme as the fellow for the Seychelles Black Parrot. This year he received some training in Education and Awareness so that he could incorporate these elements into his project activities for the Black Parrot. He also had the opportunity to do a training internship with the Mauritian Wildlife Foundation to assist on the Echo Parakeet programme there. This was invaluable in extending his avian research, climbing and bird handling skills all of which have already proved useful in the Black Parrot research programme.

PUBLICATIONS

MEDIA (NEWSPAPER & MAGAZINE ARTICLES)

06/02/2013 Long lost chameleon rediscovered in Seychelles *(Today newspaper)*
08/04/2013 Vallée de Mai celebrates 30 years as World Heritage site *(Seychelles Nation newspaper)*
11/04/2013 Where giant tortoises outnumber man 10,000 to 1 *(Seychelles Nation newspaper)*
11/04/2013 The science behind the Vallée de Mai *(Today newspaper)*
01/05/2013 The Legendary Vallée de Mai *(Silhouette, Air Seychelles in flight magazine)*
04/05/2013 Aldabra, atoll paradisiaque et laboratoire naturel *(Seychelles Nation newspaper)*
18/05/2013 A Giant Tortoise by any other name *(Science News magazine)*
21/05/2013 Prezidan Michel I rekonnet travay bann zenn dan klib Wildlife *(Seychelles Nation newspaper)*
11/06/2013 Protez nou koko-d-mer *(Seychelles Nation newspaper)*
12/06/2013 Protecting the Coco-de-Mer *(Today newspaper)*
02/07/2013 Sri Lankan President visits World Heritage Site Vallée de Mai *(Seychelles Nation newspaper)*
27/07/2013 Mancham and SIF join forces on Aldabra project *(Seychelles Nation newspaper)*
03/08/2013 Progress made against invasive alien species in Seychelles World Heritage Sites *(Seychelles Nation newspaper)*
06/08/2013 Project to protect Vallée de Mai sees success *(Today newspaper)*
12/08/2013 SPDF and SNPA work with SIF to combat Invasive Alien Species *(Seychelles Nation newspaper)*
05/09/2013 Students get involved in ecology at Vallée de Mai holiday camps *(Today newspaper)*
09/09/2013 Children experience nature close-up in holiday camp *(Seychelles Nation newspaper)*
13/09/2013 Now it's quiet in the Seychelles *(Sun & Wind Energy magazine)*
30/09/2013 Local community joins SIF in Clean up the World activity *(Seychelles Nation newspaper)*
30/09/2013 Paradise in Peril *(Silhouette, Air Seychelles in flight magazine)*
12/10/2013 Flying Conservationist *(New Scientist magazine)*
14/10/2013 SIF Facebook page relaunched *(Seychelles Nation newspaper)*
18/11/2013 Invasive species threats and management in the Vallée de Mai *(Seychelles Nation newspaper)*
10/12/2013 Vallée de Mai's 30th anniversary as a UNESCO World Heritage Site *(Today newspaper)*

SCIENTIFIC PUBLICATIONS (PEER-REVIEWED ARTICLES)

Bunbury N, Mahoune T, Raguain J, Richards H & Fleischer-Dogley F. (2013). Red-whiskered bulbuls eradicated from Aldabra. *Aliens: The Invasive Species Bulletin* 33: 8-9

Bunbury N, von Brandis R, Currie J, Jean-Baptiste M, Accouche W, Souyave J, Haupt P & Fleischer-Dogley F. (2013) Goats eradicated from Aldabra Atoll, Seychelles. *Aliens: The Invasive Species Bulletin* 33: 18-22

Mortimer J & von Brandis R. (2013). Mortality of adult green turtles (*Chelonia mydas*) at the nesting beaches of Aldabra Atoll, Seychelles. *Chelonian Conservation Biology* 12(1): 151-157

Reuleaux A, Bunbury N, Villard P & Waltert M. (2013) Status, distribution and recommendations for monitoring of the Seychelles black parrot *Coracopsis (nigra) barklyi*. *Oryx* 47(4): 561–568 (doi: 10.1017/S0030605312000300)

Šúr M, Bunbury N & van de Crommenacker J. (2013) Frigatebirds on Aldabra Atoll: Census, recommended monitoring protocol and sustainable tourism guidelines. *Bird Conservation International* 23: 214–220 (doi: 10.1017/S0959270913000087)

Šúr M, van de Crommenacker J & Bunbury N. (2013) Assessing effectiveness of reintroduction of the flightless Aldabra rail on Picard Island, Aldabra Atoll, Seychelles. *Conservation Evidence* 10: 80–84

Quanz C, Bunbury N, Fleischer-Dogley F. (2013) Improving the sustainable operation of a World Heritage Site: Increasing energy efficiency and implementing a renewable energy system on Aldabra Atoll, Seychelles. *PARKS: International Journal of Protected Areas and Conservation* 19(2): 47-58

Cover of the Aliens bulletin

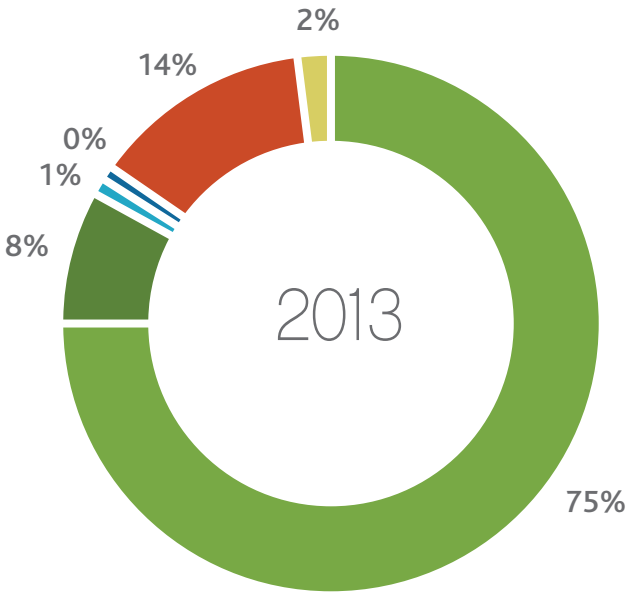
FINANCIAL INFORMATION

The main contribution of income remained the same as previous years, with Vallée de Mai entrance fees providing 75% of the yearly income which is in line with the increase in visitor numbers. Also as in previous years the income generated from Aldabra landing fees stayed low as piracy activities inhibited tourism in the Aldabra group. There was a small decline in sales at the Vallée de Mai and this is an area that will be more closely focused on in 2014 in an effort to increase the income generated from sales. Generally the income generated for SIF operations and research in 2013 remained similarly diverse with only small fluctuations, which is expected from year to year.

The effects of installing the renewable energy system on Aldabra were clearly seen in a drop in Aldabra operational costs in 2013. Alongside, as the Environmental Management System project came to a close there was a reduction in this project spending. There was a reduction in expenditure for the EU and GEF projects as the major costs were born in the initial period of these projects. A substantial increase was seen in the spending on Aldabra research/projects. This was due to the investment made by SIF into the continuing invasive bird eradication on Aldabra, which had been initially funded by UNESCO. Head Office costs rose slightly from 2012, this was attributable to a visit to Aldabra by the SIF Board. To enable them to continue to make informed management decisions for Aldabra it is important that the board members experience the operational and scientific management first hand.

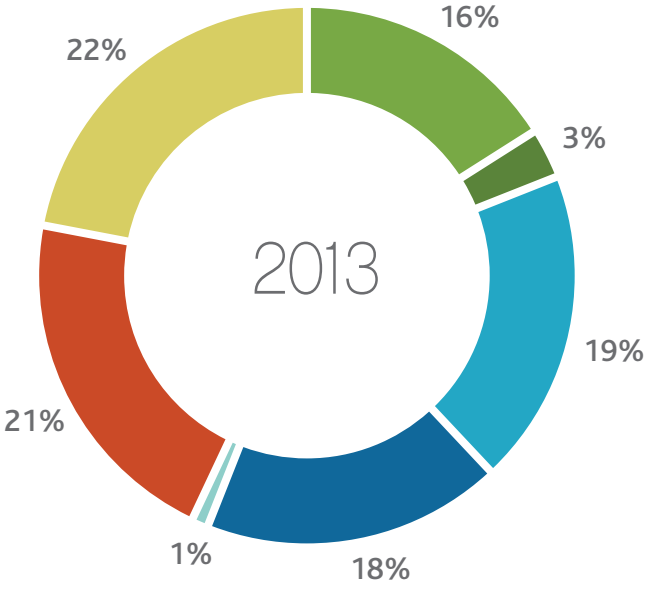
INCOME

- Vallée de Mai entrance fees
- Vallée de Mai sales
- Aldabra landing fees
- Grants
- EU/GEF projects
- Other



EXPENDITURE

- Vallée de Mai operation
- Vallée de Mai research/projects
- Aldabra operation
- Aldabra research/projects
- EMS project
- EU/GEF projects
- Head office



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SIF STAFF

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Chief Executive Officer: Dr Frauke Fleischer-Dogley

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Science Programme Officer: Wilna Accouche

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Ring-necked Parakeet Project Team Leader: Edme Melton-Durup

Lead RNP Hunter: Pete Haverson

Invasive Species Technical Officers (RNP): Julio Agricole, Laurent Leite

Volunteer (RNP): George Angell

ALDABRA STAFF

Island Manager: Joel Souyave

Aldabra Scientific Coordinator: Dr Janske van de Crommenacker and Heather Richards

Assistant Aldabra Scientific Coordinator/Takamaka Team Leader: Terence Mahoune

Senior Skipper: Jude Brice

Senior Ranger: Catherina Onezia

Ranger: Curtis Baker, Michel Malbrook, Shanni Etienne, Andy Gouffe

Trainee Ranger: Shareefa Cadeau

Senior Field Research Assistant: Ravi Moustache, Daig Romain

Field Research Assistant: Jeremy Raguain

Marine Training College Student work attachment: Sheril de Commarmond, Rebecca Filippin, Stephanie Marie

Junior Skipper: Shane Brice

Relief Skipper/Logistics Assistant: Murvin Green

Logistics Assistant: Samuel Bassett, Barney Marengo, Marvin Roseline

Cook and Logistics Assistant: Ian Mellie, Giovani Rose

Mechanic: Alain Banane

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Project Officers/consultants: Richard Baxter, Christina Quanz, Pete Haverson, Dr Grant Harper, Philip Haupt

Researcher: Dr Janske van de Crommenacker

Volunteers: Calum Ferguson, Arjan De Groene, Glenn McKinlay

Students: Wilfredo Falcon (University of Zurich)

VALLÉE DE MAI STAFF

Site Manager: Marc Jean-Baptiste

Visitor Management Coordinator: Evadney Lafortune

Visitor Sales and Services Manager: Dylis Cedras

Education and Outreach Programme Officer: Maria Brioche

Administrative and Accounts Assistant: Veronica Souyana

Property Maintenance Supervisor: Jimmy William

Sales Clerk Supervisor: Elna Stravens

Sales Clerks : Marie-Paul Bistoe, Raissa Tirant, Nathalie Ernesta, Fannia Suzette, Peggy Marie, Elza Louise, Stella Grimace, Elva Lemiel, Isha Felicie, Stephanie Dugasse

Visitor Attendants: Sarah Monthy, Winnie Walter

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Maintenance Assistant: Hendrick Quatre

Field Research Assistant: Nathachia Pierre

Rangers: Terence Payet, Dainise Quatre

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Black Parrot Project Team Leader: Anna Reuleaux

Black Parrot Project Researcher: Heather Richards

Praslin IAS Project Officer: Jorge Renteria, Lucía Latorre Piñeiro

Invasive Species Technical Officers: Julio Moustache, Carole Burnett

Students: Jim Labisko (Sooglossid Frog PhD student, Durrell Institute of Conservation and Ecology), Emma Morgan (Coco de Mer PhD student, ETH Zurich), Thomas Haee Mogensen (Giant Bronze Gecko ecology MSc student, University of Aarhus)

Volunteers: Rebeckah Fox (IAS), Lisa Beinlich (IAS), Isabel Kittel (IAS/CdM), Helene Hennig (IAS), Patrick Woods (Black Parrots)

ASSUMPTION STAFF

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Lead Hunter: Pete Haverson

Invasive Species Technical Officers: Jessica Moumou, Lina Barbe, Patrick Banville, Lauren Koehler, Katherine Raines, Edme Melton-Durup, Laurent Leite, Ronny Gabriel, Unels Bristol

Volunteers: Lotte Reiter, Abel Sorry (University of Seychelles), George Angell

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Sam Gardener (LaserPro)

Erwin Burian (Red Coral)

Acajou Hotel

Octopus Diving Centre, Praslin

Duke of Edinburgh Award Scheme

...OUR PARTNERS AND ASSOCIATES

Ministry of Environment and Energy, Ministry of Education, Seychelles National Parks Authority, Island Development Company, Island Conservation Society, Praslin Development Fund, Seychelles National Meteorological Service, IBC Solar

...the following people for their help and advice on specific projects

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The EU Project Steering Committee (Pierre-Andre Adam, Ronley Fanchette, Denis Matatiken, Pat Matyot, James Mougal, Ronny Renaud, Adrian Skerrett, Sidney Suma)

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Dr Dennis Hansen (University of Zurich, Switzerland)

Dr James Harris, Dr Sara Rocha and Dr Ana Perera (CIBIO, University of Porto)

Hazel Jackson (Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, UK)

Dr Christopher Kaiser-Bunbury (TU Darmstadt, Germany)

Dr Chris Kettle (ETH, Zurich)

Dr Jannie Linnebjerg (University of Copenhagen, Denmark)

Dr Jeanne Mortimer (University of Florida, US)

Dr Arpat Ozgul (University of Zurich, Switzerland)

Dr Eric Postma (University of Zurich, Switzerland)

Dr Chris Raxworthy (American Museum of Natural History, US)

Dr Gabriela Schaepman-Strub (University of Zurich, Switzerland)

Dr Lindsay Turnbull (University of Zurich, Switzerland)

Dr John Turner and Dr Rebecca Klaus (University of Bangor, UK)

Dr Matthias Waltert (Georg-August-Universität Göttingen, Germany)

SIF IN A NUTSHELL AND HOW TO HELP

Seychelles Islands Foundation (SIF) is a non-profit charitable organization which was established as a Public Trust in 1979 to manage, protect, research and promote sustainable ecotourism in the Seychelles' two UNESCO World Heritage sites of Aldabra Atoll and the Vallée de Mai on Praslin. A major focus is on scientific research to support and improve conservation management of the unique biodiversity and ecosystems of these two very different sites.

To successfully operate and protect two World Heritage sites which are more than 1000km apart and each with their specific set of challenges, SIF relies on income generated primarily by entrance fees and sales from the Vallée de Mai. This is supplemented by project funding, grants and donations. Aldabra used to provide direct income through visitor impact fees but piracy has almost entirely cut off this source of revenue in recent years. SIF's work with and management of these sites will continue to be dependent on visitor numbers and the generosity of our supporters for the foreseeable future.

There are a number of ways in which you can help us with this work:

- Visit the Vallée de Mai any day of the year and experience the magic of this unique site for yourself
- Purchase SIF products and souvenirs directly from the Vallée de Mai shop or the SIF Head Office in Mont Fleuri, Victoria
- Stop at the Vallée de Mai cafeteria and support local Praslinois producers and suppliers
- Tell other people about SIF and our work
- Volunteer for SIF – depending on active projects, there may be limited volunteer opportunities at both sites for suitably qualified international volunteers to help with research, conservation work or specific projects for 4-6 month periods.

If you would like to contribute, receive more information or are interested in receiving further news about SIF via monthly E-newsletters please sign up through our website or contact us by email at info@sif.sc.

You can also find more information on our website: www.sif.sc, Facebook page: 'Seychelles Islands Foundation – SIF' and Twitter page: @ SIF_Seychelles.

aldabra atoll

SIF seychelles islands foundation

vallée de mai

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